Medicine Quiz 7

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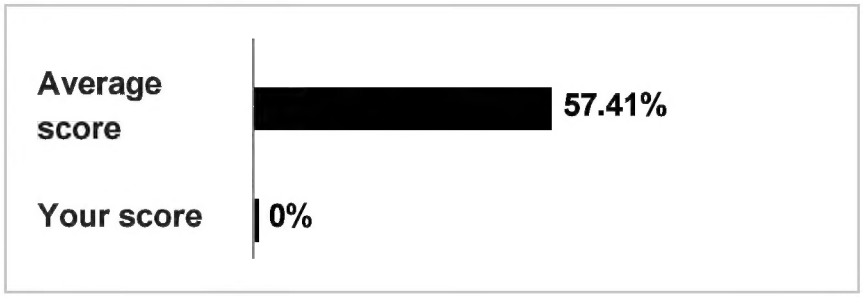

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Answered Review

1. Question **1 points**

A 56-year-old male presents with nausea, loss of appetite, fatigue and marked weakness. His past medical history is significant for hypertension, for which he is on amlodipine, and not diuretics. He was diagnosed with polymyalgia rheumatica 6 months ago, and was started on prednisone; however, he has been off prednisone for the past week. His blood pressure is 100/70 mm Hg without any orthostatic changes, heart rate is 100/min, respirations are 18/min, and temperature is 36.7C (98.0F). The rest of the physical examination is unremarkable. Lab investigations reveal:

Chemistry panel

Serum sodium: 137 mEq/L
Serum potassium: 4.8 mEq/L
Chloride: 98 mEq/L
Bicarbonate: 26 mEq/L
Blood urea nitrogen: 50 mg/dl
Serum creatinine: 0.9 mg/dl
Calcium: 9.6 mg/dl
Blood glucose: 67 mg/dl

The chest x-ray is unremarkable. Which of the following biochemical abnormalities is most likely to be present in this patient?

1. Increased ACTH, and decreased cortisol levels
2. Decreased ACTH, and decreased aldosterone levels
3. Decreased ACTH, and decreased cortisol levels ✔
4. Decreased ACTH, decreased aldosterone, and decreased cortisol levels
5. Increased ACTH, and increased cortisol levels

INCORRECT ✖

The correct answer is 3.

The patient most likely has central (tertiary) adrenal insufficiency, which resulted from the suppression of the hypothalamic pituitary (HP) adrenal axis by the administration of supraphysiological doses of prednisone over a long period of time. Suppression of the HP axis is the most common cause of adrenal insufficiency. Glucocorticoids suppress corticotropin-releasing hormone (CRH) secretion from the hypothalamus, thereby blocking the hormone's action on the anterior pituitary to release ACTH. ACTH acts on the adrenal cortex, and is responsible for the secretion of cortisol and androgen from the zona fasciculata and zona reticularis, respectively. Chronic suppression of the CRH levels takes time for its secretion to recover. The resulting CRH deficiency leads to central adrenal insufficiency, which is characterized by low ACTH and cortisol levels.

(Choices 2 & 4) Aldosterone levels remain unchanged in patients with central adrenal insufficiency. Aldosterone secretion from the zona glomerulosa of the adrenal gland is independent of CRH, and is thus preserved.

(Choice 5) Increased ACTH and increased cortisol levels can be seen physiologically in response to any stress, hypovolemia or pathological form of ACTH-dependent Cushing's syndrome.

2. Question

1 points

A 60-year-old male presents to the emergency room with the chief complaint of progressive exertional dyspnea and fatigue. He denies any chest pain, syncope, cough, or edema. He suffered an acute anterior wall myocardial infarction one month ago. Chest auscultation reveals bilateral crackles in his lower chest. Cardiac auscultation reveals a pansystolic murmur at the apex with radiation to the axilla. ECG shows previously present unchanged Q waves and a persistent ST segment elevation in the anterior leads. Based on these findings, what is the most likely underlying cause of his symptoms?

1. Interventricular wall rupture
2. Ventricular free wall rupture
3. Pulmonary infarction
4. Recurrent ischemia
5. Ventricular aneurysm ✔

INCORRECT ✖

The correct answer is 5.

Ventricular aneurysm is a complication that may occur days to months after myocardial infarction. Common consequences of ventricular aneurysms include symptoms of CHF, ventricular arrhythmias, mitral regurgitation, and/or thrombus formation. This patient's physical exam finding of a pansystolic murmur at the apex with radiation to the axilla is suggestive of mitral regurgitation, the result of aneurysmal alterations of the ventricular geometry. Persistent ST elevations are often seen on ECG in ventricular aneurysm. Echocardiography demonstrating dyskinetic wall motion of a portion of the left ventricle may be used to confirm the diagnosis.

(Choice 1) Interventricular wall rupture typically occurs around 5 days after infarction and causes an acute left-to-right shunt with right sided heart failure and new-onset systolic murmur heard best at the left lower sternal border.

(Choice 2) Ventricular free wall rupture typically occurs around 5 days after myocardial infarction and causes acute pericardial tamponade and rapid decompensation with pulseless electrical activity.

(Choice 3) Pulmonary infarction secondary to pulmonary embolism can cause dyspnea, but it should not cause new onset mitral regurgitation or ST elevations on ECG.

(Choice 4) Recurrent ischemia is a consideration, given the ST elevations on ECG. However, it appears that the ST elevations and Q waves are unchanged since the initial infarction. These findings are more consistent with ventricular aneurysm.

3. Question

1 points

A 65-year-old male presents to your office with a six-month history of periodic substernal pain. The pain episodes are experienced during strong emotion, last for 10-15 minutes, and resolve spontaneously. He has a long history of hypertension and diabetes mellitus, type 2. His right foot was amputated two years ago due to diabetes-related complications. You suspect angina pectoris and decide to perform myocardial perfusion scanning. It reveals uniform distribution of isotope at rest, but inhomogeneity of the distribution after dipyridamole injection. You conclude that the patient has ischemic heart disease. Which of the following effects of dipyridamole helped you in making the diagnosis?

1. Increased heart contractility
2. Coronary steal ✔
3. Dilation of diseased vessels
4. Inhibition of platelet aggregation
5. Placebo effect

INCORRECT ✖

The correct answer is 2.

The history is suggestive of angina pectoris in this patient (episodes of substernal pain provoked by emotion). Exercise testing is not possible, because this patient's activity is limited by amputation. Myocardial perfusion scanning can be employed instead using dipyridamole to reveal the areas of restricted myocardial perfusion. Dipyridamole and adenosine are coronary vasodilators. Infusion of these substances in patients without coronary artery disease, increases coronary blood flow three to five times above the baseline levels. However, in patients with coronary artery disease, the diseased vessels distal to the obstruction are already maximally dilated **(Choice 3)**, and their ability to increase myocardial perfusion is limited; therefore, redistribution of coronary blood flow to 'non-diseased' areas occurs, and the perfusion of 'diseased' segments diminishes. This phenomenon demonstrated by dipyridamole is called coronary steal and is used to diagnose ischemic heart disease.

(Choices 1, 4 & 5) Dipyridamole is a potent antiplatelet aggregate, but this property is not employed to assist in diagnosis. Increased cardiac contractility can occur as the result of vasodilatation, but it is a secondary phenomenon. Placebo effect is irrelevant in this case.

4. Question

1 points

A 37-year-old healthy Caucasian male is seen in your office for a routine physical examination. He denies any symptoms or illness. He says he smokes a pack a day and drinks one to two beers every weekend. He has no allergies. Examination is unremarkable. The EKG reveals normal sinus rhythm with a heart rate of 72; there are frequent premature atrial beats present. The blood pressure is 120/65mm Hg. The next step in his management is:

1. Digoxin
2. Lidocaine
3. Order potassium levels
4. Complete electrophysiological study
5. Observation ✔

INCORRECT ✖

The correct answer is 5.

The diagnosis of atrial premature beats depends upon the recognition of 'P' waves that are premature relative to sinus cycle length and which differ in morphology from sinus 'P' waves. Atrial premature beats frequently reset the sinus node, producing pauses, which are only partially compensatory. The QRS width is normal. Premature atrial beats may be completely normal or due to anxiety, CHF, hypoxia, caffeine or electrolyte abnormalities. Premature atrial beats never require any treatment and are completely benign.

(Choice 1): Digoxin is a classic inotrope, which is frequently used in the treatment of atrial arrhythmias, especially fibrillation. It increases the AV nodal refractoriness and thereby slows the ventricular rate in atrial fibrillation and flutter. Digoxin is particularly used in patients with heart failure (systolic dysfunction) and atrial fibrillation/flutter. Digoxin has no role in the management of premature atrial beats.

(Choice 2): Lidocaine is a class 1 anti arrhythmic agent used in the treatment of ventricular arrhythmias. It has no role in the treatment of atrial arrhythmias. The drug is usually given intravenously.

(Choice 3): Rarely premature atrial beats may be due to electrolyte abnormalities. In such cases, levels of potassium, magnesium and calcium may need to be evaluated. Removing the causative agent or replacing the deficient electrolyte can treat premature atrial beats. Electrolyte abnormalities are unlikely in a healthy patient without comorbid illnesses.

(Choice 4): Electrophysiological study can establish whether an anomalous pathway is present or absent and allow its localization. Premature atrial beats do not have an anatomical disturbance and EP studies are not helpful at all.

5. Question

1 points

A 56-year-old white male presents with dyspnea for the last 3 months. His dyspnea was initially exertional but it has worsened progressively and now he is breathless even at rest. He denies any chest pain or ankle swelling. He has been smoking one-pack/day cigarettes for the last 30 years and has been drinking alcohol heavily for the last 10 years. He is not taking any medication. His mother died of breast cancer at 57. His vitals are, PR 86/min, BP 113/76mm of Hg; Temperature 37.1 °C (98.9 °F); RR 13/min. On auscultation of his precordium an S3 is heard, but there are no murmurs. Chest auscultation reveals bilateral basal crepitations. Chest x-ray shows marked cardiac silhouette enlargement and pulmonary venous congestion. EKG shows non-specific ST-T wave changes. Echocardiography shows a dilated left ventricle and systolic dysfunction (EF of 25-30%). CBC shows hematocrit of 32%, WBC count of 6,000/microL, and platelet count of 60,000/microL. Peripheral blood smear shows MCV of 101 fl. LFTs show AST of 1 BOU/L and ALT of 66 U/L. The findings of cardiac catheterization and coronary angiography are not compatible with the diagnosis of ischemic cardiomyopathy. Which of the following measures is most likely to reverse his heart failure?

1. Cessation of cigarette smoking
2. Abstinence from alcohol ✔
3. Reduced salt intake
4. Use of ACE inhibitors
5. Use of digoxin

INCORRECT ✖

The correct answer is 2.

This patient is most likely suffering from dilated cardiomyopathy secondary to alcoholism. Findings of thrombocytopenia, macrocytosis, and elevated transaminases are all suggestive of alcoholism in this patient. His cardiomyopathy could be due to ischemia but coronary angiography excluded this diagnosis in this patient. Total abstinence from alcohol is the mainstay of alcoholic cardiomyopathy management and it may reverse this condition if it is employed earlier in the course of the disease. Reduced salt intake only improves symptoms of heart failure and does not reverse the disease process itself. Digitalis is most useful in those heart failure patients who have systolic dysfunction and have rapid ventricular rates due to atrial flutter or atrial fibrillation. It proves to be useful in these cases by its positive inotropic effect and negative dromotropic (slowing AV conduction). Use of digitalis has not been shown to provide any survival advantage in patients with congestive heart failure and has not been shown to reverse the disease process.

ACE inhibitors have been shown to slow the progression of heart failure but they don't reverse the disease process of alcoholic cardiomyopathy. ACE inhibitors should be given to all patients with heart failure who have systolic dysfunction unless they are contraindicated or the patients can't tolerate them.
Cigarette smoking is a risk factor for coronary heart disease and its cessation should be encouraged in all patients with heart failure. Cessation of cigarette smoking does not reverse the disease process of alcoholic cardiomyopathy.

6. Question

1 points

A 68-year-old white female presents to the ER complaining of sudden onset chest pain associated with two episodes of vomiting. She has hypertension for which she takes atenolol and hydrochlorothiazide. Her pulse is 60/min, blood pressure is 80/50 mm Hg and respirations are 14/min. Examination shows elevated jugular venous pressure and a positive Kussmaul's sign. Her lungs are clear to auscultation. Her EKG shows 2 mm ST segment elevation in leads 11, III and aVF and 1 mm ST segment depression in leads I and aVL. Which of the following is the most likely cause of this patient's hypotension?

1. Pulmonary thromboembolism
2. Right ventricular infarction ✔
3. Interventricular septum rupture
4. Variant angina
5. Intravascular volume depletion

INCORRECT ✖

The correct answer is 2.

This patient's hypotension is caused by right ventricular infarction. The patient has ST elevations in the inferior leads, which strongly suggests an inferior infarct. Involvement of the right ventricle is present in 1 /3 of inferior infarcts. Furthermore, ST depression in leads I and AVL (the left-most leads) may reflect STEMI affecting the right side of the heart. Right sided ECG leads can be placed to confirm a right ventricular infarct. Jugular venous distention and Kussmaul's sign (increase in JVD with inspiration) along with clear lung fields all point towards right ventricular failure. Failure of the right ventricle leads to decreased preload, and therefore can result in decreased cardiac output and hypotension. This patient also has a relatively low heart rate given her hypotension which is suggestive of possible SA node ischemia. Patients with right ventricular infarcts require a high preload to maintain their blood pressure, and are therefore treated with IV fluids. Preload reducing agents such as nitroglycerine and diuretics must be avoided.

(Choice 1) Pulmonary thromboembolism can often present similarly to right ventricular infarction, with right sided heart failure and hypotension if the embolus is massive. The finding of ST Elevation on the EKG points towards MI, whereas PE is more likely to present with sinus tachycardia, new onset RBBB or S 1 Q3T3 on ECG.
(Choice 3) Interventricular septum rupture can lead to a left-to-right shunt. The resulting increased strain on the right ventricle can result in right ventricular failure. However, a pansystolic murmur would likely be heard on exam and ST elevations would not be expected.
(Choice 4) Variant angina may present with transient ST elevations, but should not cause hypotension or physical exam findings of right sided heart failure.
(Choice 5) Intravascular volume depletion can cause hypotension, but is associated with flattened jugular veins and not elevated JVP.

7. Question

1 points

A 53-year-old man presents to your office complaining of weakness and exertional dyspnea over the last week. He denies chest pain and palpitations. He has no other past medical history. His father died of a myocardial infarction at age 55. On exam, his heart rate is 100/min and blood pressure is 90/60 mm Hg. Internal jugular venous pulsation is observed 7 cm above the sternal angle. Lungs are clear to auscultation. Heart sounds are muffled. Which of the following is the most likely cause of this patient's complaints?

1. Decreased cardiac contractility
2. Left ventricular outflow obstruction
3. Decreased left ventricular preload ✔
4. Pulmonary hypertension
5. Increased right ventricular compliance

INCORRECT ✖

The correct answer is 3

This patient has all three of Beck's triad for cardiac tamponade: hypotension, jugular venous distention (JVD), and muffled heart sounds. Cardiac tamponade occurs when the pericardial space fills with fluid. This can result from many causes, including infection, myocardial infarction, malignancy, uremia, and trauma. Of note, the degree of clinical symptoms depends largely on how quickly the pericardial fluid accumulates. The faster it accumulates, the sooner symptoms will develop.

The pathophysiology of cardiac tamponade is as follows. When fluid in the pericardial sac causes the pressure to rise above the diastolic pressure of the ventricles, the ventricles become less able to expand to accept venous return to the heart. As a result of the decrease in preload, stroke volume falls and thus cardiac output is reduced. The decrease in cardiac output is further exacerbated during inspiration because the lower intrathoracic pressure allows more systemic venous blood to return to the right ventricle, causing the intraventricular septum to bow into the left ventricle and further reduce left ventricular filling. This phenomenon is responsible for the finding of pulsus paradoxus on exam. A hepatojugular reflex might also be observed on exam.

(Choice 1) Decreased cardiac contractility is observed in patients with systolic heart failure. They will typically have signs of both left ventricular failure (e.g., crackles on pulmonary exam and an S3) and right ventricular failure (e.g., JVD and peripheral edema). The patient in this vignette does not have signs of left ventricular failure.

(Choice 2) Left ventricular outflow obstruction results from critical aortic stenosis or from hypertrophic obstructive cardiomyopathy (HOCM). Although this patient does have exertional dyspnea, there is no other suggestion of aortic stenosis (e.g., syncope, systolic murmur) in this vignette, and most patients with HOCM present at a much earlier age. Importantly, the systolic murmur of HOCM will decrease with squatting and increase with straining.

(Choice 4) Pulmonary hypertension can result from increased pulmonary arterial pressure, as with primary pulmonary hypertension, or with increased pulmonary venous pressure, as occurs in left ventricular failure. The cardiac exam will reveal a loud S2. Pulmonary arterial hypertension is typically an indolent process and does not present as right heart failure until late in the disease.

(Choice 5) Right ventricular compliance will decrease, not increase, in cardiac tamponade.

8. Question

1 points

A 24-year-old military recruit is brought to the emergency room after suddenly collapsing while at training camp. Witnesses say he lost consciousness, and in the ER he appears confused. He had apparently been in his usual state of good health until this incident. His medical history includes allergic rhinitis for which he takes chlorpheniramine. On physical examination, his temperature is 41 °C (106 °F), blood pressure is 90/60 mm Hg, respiratory rate is 22/min, and pulse is 130/min and regular. He appears restless. His pupils are 4mm in size, symmetric, and reactive to light. Lung exam reveals a few rales at both lung bases. His abdomen is soft, non-tender and bowel sounds are present. There is no neck stiffness. His skin is dry and hot. He has 2+ symmetric reflexes in the upper and lower extremities. Muscle tone and bulk are normal. Initial laboratory studies show:

Hemoglobin: 16.0 g/L
Platelets: 120,000/mm3
Leukocyte count: 18,500/mm3
Blood urea nitrogen (BUN): 40 mg/dL
Prothrombin time: 17 sec
Partial thromboplastin time: 40 sec

Which of the following is the most likely cause of his current condition?

1. Heat stroke ✔
2. Meningitis
3. Anticholinergic toxicity
4. Serotonin syndrome
5. Thyroid storm

INCORRECT ✖

The correct answer is 1.

This young military recruit was likely engaged in strenuous exercise at the time of his collapse. Although no mention is made of the outdoor conditions, it is likely that he was exposed to hot, humid weather. In atmospheres with more than 75% humidity, sweating (the body's main mechanism of heat dissipation) may become ineffective, and hyperthermia can result. Furthermore, this patient was taking an antihistamine, which also has anticholinergic activity and can further impair heat dissipation. Heat stroke is defined as a body temperature above 40.5 °C (105 °F). Dehydration is common in heat stroke, and is manifested in this patient by hot, dry skin and hypotension. Tachycardia, tachypnea and hemoconcentration are all signs consistent with dehydration as well. Hyperthermia in heat stroke disrupts enzymatic activity, resulting in multi-organ system effects. Seizures, acute respiratory distress syndrome (ARDS), disseminated intravascular coagulation (DIC), and hepatic/renal failure may occur. In this patient, ARDS is indicated by scattered rales on exam, and DIC is suggested by low platelets and PT/PTI prolongation.

(Choice 2) Meningitis is unlikely given the lack of nuchal rigidity or photosensitivity. Also, the onset of meningitis is rarely so acute.

(Choice 3) Anticholinergic toxicity may present with hot dry skin, tachycardia, and hyperthermia, as in this patient. However, bowel sounds would be absent, and systemic effects like DIC and ARDS would not be expected.

(Choice 4) Serotonin syndrome and neuroleptic malignant syndrome (NMS) belong in the differential for patients with hyperthermia. However, hypertension and neuromuscular hyperactivity are prominent in these conditions.

(Choice 5) Thyroid storm presents with tachycardia, hyperthermia, and altered mental status. However, DIC and ARDS are not expected.

9. Question **1 points**

A 56-year-old man presents to your office complaining of progressively worsening fatigue. He also reports difficulty concentrating and increasing forgetfulness over the past several weeks. On review of systems, the patient reports having unintentionally gained 6 pounds over the last three months. His past medical history is significant for hypertension and atrial fibrillation. On physical examination, he has a blood pressure of 140/90 mmHg and a heart rate of 75/min. His lung fields are clear to auscultation. There is no ankle edema. His skin is dry. Which of the following drugs is most likely responsible for this patient's complaints?

1. Hydralazine
2. Metoprolol
3. Verapamil
4. Enalapril
5. Amiodarone ✔

INCORRECT ✖

The correct answer is 5.

This patient has developed difficulty concentrating, fatigue, dry skin, and weight gain while receiving treatment for hypertension and atrial fibrillation. These symptoms are concerning for amiodarone-induced hypothyroidism. Because of this adverse effect of amiodarone use, patients receiving amiodarone therapy must have their TSH followed regularly. Amiodarone can also cause lung fibrosis and liver toxicity, thus, patients require regular assessments of pulmonary function and liver enzyme concentrations as well.

(Choice 1) Hydralazine can cause salt retention, reflex tachycardia, and a lupus-like syndrome.

(Choice 2) Metoprolol can cause impotence, bradycardia, and AV node blockade.

(Choice 3) Common side effects of verapamil include constipation, dizziness, and flushing.

(Choice 4) Enalapril is most commonly associated with hyperkalemia, cough, decreased GFR, rash, and angioedema.

10. Question

1 points

A 33-year-old Russian male reports concern over recurrent episodes of a "pounding" and "racing" heart over the last several months. He says his symptoms are worst while lying supine and while lying on his left side. On physical examination, his blood pressure is 150/55 mm Hg and heart rate is 73/min. Which of the following is most likely responsible for his symptoms?

1. Aortic regurgitation ✔

2. Pulmonary regurgitation
3. Mitral stenosis
4. Tricuspid stenosis
5. Aortic stenosis

INCORRECT ✖

The correct answer is 1.

Aortic regurgitation (AR) is associated with a wide pulse pressure (systolic – diastolic blood pressure), 95 mmHg in this patient. A wide pulse pressure causes a "water hammer pulse," which many patients experience as a pounding heartbeat. Lying flat and turning to the left brings the heart closer to the chest wall and can make the patient more aware of the forceful heartbeat. In Australia, aortic root dilation and bicuspid aortic valve are one of the most common causes of AR. In many other countries where antibiotics are less available, rheumatic fever is the most common cause.

(Choice 2) Pulmonary regurgitation should not cause widening of the peripheral pulse pressure.

(Choice 3) Mitral stenosis can also occur secondary to rheumatic heart disease, but typically causes pulmonary symptoms like pulmonary edema and hemoptysis. Mitral stenosis would not be expected to cause widening of the peripheral pulse pressure.

(Choice 4) Tricuspid stenosis typically causes symptoms of right sided heart failure with clear lungs. The peripheral pulse pressure would not be increased.

(Choice 5) In contrast to the "water hammer pulse" of AR, patients with aortic stenosis usually have a weak pulse described as "parvus et tardus."

11. Question

1 points

A 34-year-old man rushes into the ER complaining of severe substernal chest pain that began abruptly 30 minutes ago. He says that he also feels as though his heart 'is racing,' but denies any shortness of breath, cough or fever. He has never experienced pain like this before. His past medical history is significant for an appendectomy one year ago. The patient reports that his father died at age 64 due to "some heart problem" and his mother died of ovarian cancer. On physical examination, the patient is agitated and sweating profusely. His pulse is 110/min, blood pressure is 60/100 mm Hg, and respirations are 14/min. Physical examination is normal except for dilated pupils and a small amount of blood at the external nares. EKG shows ST elevations in leads v1_v4. What is the most likely explanation for his symptoms?

1. Atherosclerotic vascular disease
2. Acute pericarditis

3. Pleurodynia
4. Drug-induced vasospasm ✔
5. Aortic dissection

INCORRECT ✖

The correct answer is 4.

This patient's dilated pupils and blood-crusted nose suggest cocaine abuse. Cocaine inhibits catecholamine reuptake from neuronal synapses, and is therefore sympathomimetic. In some, cocaine-induced vasospasm can be so severe as to cause myocardial ischemia and/or infarction, which, given this patient's chest pain and ST elevations, is likely the case here. Patients may not always be forthcoming about drug use, so it is important to maintain a high index of suspicion in the right clinical setting. Cocaine-induced ST elevation myocardial infarctions (STEMIs) are treated the same as classic STEMIs, with PTCA or thrombolysis. Aspirin and nitrates are also appropriate, but β-blockers should be avoided. β-blocker therapy administered to cocaine-using individuals allows unopposed alpha agonist activity that can worsen vasospasm. Calcium channel blockers and alpha blockers like phentolamine can also help reduce vasospasm in these patients.

(Choice 1) Atherosclerotic heart disease would be rare in a patient this young without documented additional risk factors.

(Choice 2) Acute pericarditis can cause ST elevations on EKG, which are often accompanied by PR depressions. Pericarditis is not a common complication of cocaine use.

(Choice 3) Pleurodynia is chest pain typically of pulmonary etiology that is worse with deep breathing. While cocaine can cause pleuritic chest pain through a variety of different mechanisms, ST elevations would not be expected on EKG.

(Choice 5) While cocaine can cause aortic dissection, this patient's ST elevations are more suggestive of myocardial infarction.

12. Question

1 points

A 62-year-old man visits his family physician because of generalized aches and pains. He denies associated fevers, headaches, chest pain, or abdominal discomfort. His past medical history is significant for an inferior wall myocardial infarction 6 years ago. His other medical problems include hypertension, diabetes, hypercholesterolemia, and gout. His current medications are aspirin, losartan, naproxen, atenolol, glipizide, colchicine, and simvastatin. On physical exam today, he is afebrile, with blood pressure 130/90 mm Hg, pulse 80/min and respirations 18/min. Lab results are as follows:

Sodium: 140 mEq/L
Potassium: 4.2 mEq/L
Bicarbonate: 21 mEq/L
Chloride: 100 mEq/l

BUN: 30 mg/dL
Creatinine: 1.6 mg/dL
AST: 113 IU/L
ALT: 120 IU/L
Creatine phosphokinase: 14,998 mg/dL

What is the most appropriate next step in the management of this patient?

1. Stop losartan
2. Stop simvastatin ✔
3. Start N-acetylcysteine
4. Order hepatitis panel
5. Obtain liver biopsy

INCORRECT ✖

The correct answer is 2.

This patient's highly elevated creatine phosphokinase (CPK) points towards muscle injury, a possible side effect of statins. The muscle injury can progress to rhabdomyolysis with renal failure, so statin medications should be stopped in patients who develop highly elevated CPKs. This patient's BUN and creatinine are also elevated; comparison to prior labs would be helpful in determining if this renal compromise is acute or chronic. This patient also has slightly elevated transaminases, another potential side effect of statin therapy.

(Choice 1) Losartan is an angiotensin receptor blocker (ARB), and as such its common side effects are hyperkalemia, hypotension, and renal failure.

(Choice 3) N-acetylcysteine has three primary uses: dissolution of mucus, protection against contrast induced renal failure, and therapy for acetaminophen overdose.

(Choices 4 & 5) The mild elevation of this patient's transaminases is likely the result of his statin therapy. To confirm that this is the case, liver function tests can be repeated after the statin is stopped to ensure that the AST and ALT are trending down.

13. Question **1 points**

A 50-year-old white male comes into your office for a routine checkup. He has no present complaints. His past medical history is significant for hypertension controlled with a low-dose thiazide diuretic. His family history reveals non-fatal myocardial infarction in his father at the age of 4 7. The patient does not smoke or consume alcohol. His blood pressure is 130/75 mmHg and his heart rate is 70/min. His previous records show that his HDL level is persistently low in spite of

acceptable total cholesterol and LDL levels. You prescribe niacin to raise HDL level. The patient returns in a week complaining of intensive generalized pruritus and flushing. What is the most probable cause of the patient's complaint?

1. Hypersensitivity reaction
2. Prostaglandin-related reaction ✔
3. Drug interaction
4. Drug-induced vasoconstriction
5. Psychogenic reaction

INCORRECT ✖

14. Question

1 points

A 74-year-old woman presents to your office complaining of diarrhea and decreased appetite over the past week as well as increasing fatigue and occasional palpitations over the last few days. Her past medical history is significant for chronic atrial fibrillation for which she takes metoprolol, digoxin and warfarin. She smokes cigarettes and has for the past several years. On physical examination, her blood pressure is 140/90 mmHg and her heart rate is 70/min and irregular. Lung auscultation reveals scattered wheezes. Her abdomen is soft and non-tender. The liver span is 8 cm and the spleen is not palpable. There is no ankle edema. Her last measured INR was 2 .3 two weeks ago. Which of the following is the best initial test in this patient?

1. Echocardiography
2. Chest x-ray
3. Pulmonary function tests
4. Thyroid function tests
5. Blood drug level ✔

INCORRECT ✖

The correct answer is 5.

This is a patient receiving treatment for chronic atrial fibrillation who presents with diarrhea and

nausea. Given her medication list, the most likely culprit for her symptoms is digoxin intoxication. Digoxin is a cardiac glycoside used to treat atrial fibrillation and heart failure. Because it has myriad adverse effects, patient's digoxin levels must be monitored closely. Potential side effects of digoxin include nausea, vomiting, diarrhea, blurry yellow vision, and arrhythmias. Characteristic ECG findings in digoxin toxicity include scooped ST segments, prolonged PR intervals, shortened QT intervals, and T-wave inversion. Renal failure and hypokalemia exacerbate digoxin toxicity.

(Choice 1) Echocardiography can be beneficial in evaluating systolic and diastolic function, ejection fraction, wall motion abnormalities, and valve disorders. This patient does not have clinical features suggestive of heart failure.

(Choice 2) Aside from wheezes on exam, this patient does not clinical signs suggestive of a primary pulmonary process. Moreover, none of her medications cause significant pulmonary toxicity, and lung disease would probably not cause her GI symptoms.

(Choice 3) Pulmonary function tests are used to diagnose restrictive and obstructive pulmonary diseases. Although she has wheezing on physical exam, which may suggest a component of bronchoconstriction, neither COPD nor asthma would account for her GI symptoms.

(Choice 4) TSH, T3, and T4 levels are measured to evaluate a patient's thyroid function. Hyperthyroidism can cause diarrhea, palpitations, and changes in appetite. However, it is more likely that this patient's presentation is related to an adverse medication effect rather than to a new disease process.

15. Question

1 points

A 43-year-old male complains of frequent epigastric burning not relieved by antacids. The sensation is typically brought on by heavy lifting at work and takes 10-15 minutes to go away. He denies having associated arm or neck pain, cough, shortness of breath or difficulty swallowing. His past medical history is significant for systemic lupus erythematosus (SLEJ diagnosed five years ago, for which he takes low-dose prednisone daily. On physical examination, his blood pressure is 140/90 mmHg and pulse is 80/min and regular. Heart, lung, and abdomen exams are unremarkable. EKG is normal. Which of the following is the best next step in managing this patient?

1. Echocardiogram
2. Coronary angiography
3. Exercise EKG ✔
4. Myocardial perfusion testing
5. Esophageal motility studies

INCORRECT ✖

The correct answer is 3.

The first step in managing this patient should be to obtain an exercise EKG, as the exertional nature of his discomfort is concerning for ischemic heart disease. Both SLE and chronic steroid use are risk factors for accelerated coronary atherosclerosis. Exercise may induce ischemic changes on EKG that might not be present at rest. Since the patient's baseline EKG is normal and he is able to exercise, imaging with the stress test **(Choice 4)** is unnecessary. If the stress test is normal, then further workup for the cause of the burning sensation could be done, probably focusing on a possible GI etiology.

(Choice 1) In a patient with baseline EKG changes, an exercise echocardiogram can help assess for regional wall motion abnormalities. A resting echocardiogram, however, is not an effective test for coronary artery disease.

(Choice 2) Coronary angiography is the gold standard for detecting coronary artery disease, but is probably more aggressive than is necessary at this time. If the patient's stress test is positive, coronary angiography may be necessary.

(Choice 5) Esophageal motility studies can be useful in patients with dysphagia or suspected diffuse esophageal spasm or nutcracker esophagus. This patient's pattern of discomfort with exertion makes GI etiologies less likely.

16. Question

1 points

A 64-year-old white female presents for evaluation of two weeks of decreased appetite and nausea. She also notes occasional palpitations, which have been especially prominent over the past two days. Her medical history is significant for an anterior wall myocardial infarction one year ago and secondary congestive heart failure with left ventricular systolic dysfunction. Her current medications include aspirin, digoxin, furosemide, enalapril and metoprolol. On physical examination, her blood pressure is 120/80 mm Hg, pulse is 106/min and respirations are 15/min. The remainder of her exam is unremarkable. Chest x-ray shows an enlarged cardiac silhouette and normal lung fields. On laboratory testing, her digoxin level is twice the upper limit of normal. You order an EKG. Which of the following arrhythmias is most specific for digitalis toxicity?

1. Atrial flutter
2. Atrial fibrillation
3. Mobitz type II second-degree AV block
4. Atrial tachycardia with AV block ✔
5. Multifocal atrial tachycardia

INCORRECT ✖

The correct answer is 4.

Atrial tachycardia with AV block is the arrhythmia most specific for digitalis toxicity. Digitalis can increase ectopy in the atria or ventricles, which can lead to atrial tachycardia. Atrial tachycardia is distinguished from atrial flutter by its somewhat slower atrial rate (150-250 bpm as opposed to 250-350 bpm). P-waves are present, but may appear different from the p-waves normally seen when conduction originates in the SA node. In atrial tachycardia, the closer the ectopic focus is to the SA node, the closer the resemblance of its p-waves to normal p-waves originating from the SA node. In addition to causing ectopic rhythms, digitalis can also increase vagal tone and decrease conduction through the AV node, potentially causing AV block. Since it is rare for both ectopy and AV block to occur at the same time, when they do, the combination is fairly specific for digitalis toxicity.

(Choice 1) Digitalis toxicity does not commonly cause atrial flutter.

(Choice 2) There are many potential causes of atrial fibrillation, but digitalis toxicity is not one of them. Digitalis can be used to increase vagal tone and is sometimes used to treat atrial fibrillation if β-blockers or calcium channel blockers have not been completely effective.

(Choice 3) Digitalis would not be expected to cause Mobitz type II second-degree AV block, as this involves pathology of the conduction system below the AV node.

(Choice 5) Multifocal atrial tachycardia is rarely associated with digitalis use. It is more commonly a consequence of pulmonary disease.

17. Question

1 points

A 63-year-old male is admitted for sudden onset severe chest pain. His ECG reveals ST elevation in leads V2- V6. He is treated with thrombolytic therapy, heparin, aspirin, metoprolol, morphine, and nitrates. A coronary angiogram performed after thrombolytic therapy reveals 50% obstruction of the left anterior descending artery. On the third day of hospitalization, the patient suddenly develops severe shortness of breath at rest and hypotension. Examination reveals a soft S 1, an apical pansystolic murmur radiating to the axilla, and bibasilar crackles. His temperature is 37.8 °C (100 °F), blood pressure is 92/58 mm Hg, heart rate is 102/min, and respirations are 31 /min. An echocardiogram performed on the second hospital day reveals an akinetic region of the anterior wall. What is the most likely explanation for this patient's deterioration?

1. Pericardial tamponade
2. Pulmonary embolism
3. Rupture of ventricular septum
4. Papillary muscle dysfunction ✔
5. Acute aortic dissection

INCORRECT ✖

The correct answer is 4.

This patient suffered an anterior wall myocardial infarction (MI) and was treated appropriately. The development of hemodynamic compromise 3- 7 days after an MI raises suspicion for mechanical complications of MI, as this is the point during the healing process in which the infarcted myocardium is softest and most prone to rupture. The three major mechanical complications of MI include mitral regurgitation due to papillary muscle rupture, left ventricle free wall rupture, and interventricular septum rupture. While all three complications can result in hypotension, the presence of a pansystolic murmur that is loudest at the apex with radiation to the axilla is the classic murmur of mitral regurgitation. S 1 is the sound formed by closure of the mitral and tricuspid valves, and improper closure of the mitral valve will soften S 1 . Shortness of breath and bibasilar crackles are indicative of pulmonary edema and left ventricular failure. Therefore, these clinical manifestations are consistent with acute mitral regurgitation.

(Choice 1) Rupture of the left ventricular free wall classically results in pericardial tamponade. While this condition often results in sudden death, patients who survive the initial insult may develop hypotension, jugular venous distension, distant heart sounds, pericardial rub, and pulsus paradoxus.

(Choice 2) This patient's mobility is likely compromised by his recent MI, thereby placing him at increased risk for pulmonary embolism (PE). PE frequently presents with dyspnea, tachypnea, pleuritic chest pain, and hypotension. Mitral regurgitation or new onset murmurs are not typically identified.

(Choice 3) Like papillary muscle rupture, ventricular septal rupture results in a pansystolic murmur. It differs in that the murmur is heard best at the left sternal border, often has an accompanying thrill, and is less likely to radiate to the axilla.

(Choice 5) Acute aortic dissection classically presents with hypertension-not hypotension, tearing chest or back pain, and unequal pulses. This patient's murmur and pulmonary edema are not characteristic of aortic dissection.

18. Question **1 points**

A 34-year-old female presents to your office complaining of pressure-like, substernal chest pain that has been affecting her recently when she plays active sports. Resting consistently alleviates the pain. She denies any associated nausea, vomiting, diaphoresis, dyspnea, palpitations or syncope. Family history is non-contributory. On physical examination, her pulse is 79/min and blood pressure is 130/70 mm Hg. Cardiac auscultation reveals a high-pitched 3/6 systolic murmur best heard at the second right intercostal space. The lungs are clear to auscultation. Chest x-ray shows a normal sized heart and clear lung fields. What is the most likely cause of this patient's chest pain?

1. Anomalous origin of the right coronary artery

2. Atherosclerotic narrowing of the coronaries
3. Increased myocardial oxygen demand ✔
4. Increased myocardial oxygen extraction
5. Stretching of the papillary muscles

INCORRECT ✖

The correct answer is 3.

This patient's exertional chest pain that improves with rest suggests angina. The description of her murmur is consistent with aortic stenosis. Aortic stenosis in a young individual is usually the result of a congenitally bicuspid aortic valve. Patients with severe aortic stenosis often have large left ventricular mass, which then requires additional oxygen. In such patients, increased myocardial oxygen demand can cause anginal pain. Accompanying prolonged myocardial contraction and impaired diastole, both of which reduce blood flow through the coronary arteries, exacerbate the situation. (Given her history and young age, hypertrophic obstructive cardiomyopathy should also be considered. However, the classic murmur of this condition is usually located at the left lower sternal border.)

(Choice 1) An anomalous right coronary artery origin can lead to angina if the artery is compressed by other structures, but there should be no murmur on cardiac auscultation.

(Choice 2) Atherosclerotic narrowing of the coronaries can lead to symptoms of angina, but is unlikely in this patient given her young age and lack of risk factors.

(Choice 4) The myocardium is usually not able to increase its extraction of oxygen. Instead, the myocardium usually meets increased oxygen demands by inducing dilation of the coronary arteries.

(Choice 5) Stretching of the papillary muscles can lead to mitral regurgitation, but this murmur is normally heard best at the apex. Mitral regurgitation can occur secondary to myocardial ischemia, but it does not typically cause myocardial ischemia.

19. Question **1 points**

A 45-year-old mildly overweight smoker presents with occasional episodes of nocturnal substernal chest pain that wakes her up from sleep. The episodes last 15-20 minutes and resolve spontaneously. She denies any illicit drug use. She leads a sedentary lifestyle but states that she can climb two flights of stairs without any discomfort. Her pulse is 78/min and regular, blood pressure is 130/70 mmHg and respirations are 13/min. Auscultation of her heart and lungs is unremarkable. Extended ambulatory ECG monitoring reveals transient ST segment elevations in leads V4-V6 during the pain attack. The pathophysiology of this patient's condition is most similar to that of which of the following?

1. Lacunar stroke
2. Intermittent claudication
3. Abdominal aortic aneurysm
4. Raynaud phenomenon ✔
5. Pulmonary embolism

INCORRECT ✖

The correct answer is 4.

This patient has variant angina, also known as Prinzmetal's angina. It is caused by temporary spasm of the coronary arteries, as opposed to atherosclerotic narrowing which is seen in myocardial infarction. Young women are classically affected, and the greatest risk factor for variant angina is smoking. Aside from smoking, there is often an absence of cardiovascular risk factors. Variant angina is associated with other vasospastic disorders, such as Raynaud's phenomenon and migraine headaches. The episodes often occur in the middle of the night (midnight to 8 am) and are precipitated by exercise, hyperventilation, emotional stress, cold exposure or cocaine use. The angina episodes are accompanied by transient ST elevations with return of ST segments to baseline upon resolution of symptoms. This is in contrast to the ST depressions seen in unstable angina, and the longer duration of ST elevations seen in myocardial infarction. Medical therapy for variant angina typically involves calcium channel blockers or nitrates.

(Choice 1) Lacunar strokes occur in the setting of hypertension, and affect small, penetrating arteries which supply the basal ganglia, subcortical white matter, and pons. Occlusion of these small arteries by microatheroma and lipohyalinosis is the mechanism of lacunar stroke-not vasospasm.

(Choices 2 & 3) Intermittent claudication is leg pain that occurs with exercise and is due to atherosclerotic narrowing of the arteries feeding the leg. The mechanism is similar to that of typical angina, not variant angina. Abdominal aortic aneurysms are also the result of atherosclerotic disease.

(Choice 5) The most common cause of pulmonary embolism is embolization of blood clots from the deep veins of the lower extremities. Variant angina does not involve embolic phenomena.

20. Question

1 points

An 84-year-old Caucasian male is brought to the ER with severe chest pain, dyspnea and diaphoresis. His past medical history is significant for a long history of hypertension and diabetes mellitus, type 2. He experienced a severe myocardial infarction 6 months ago. His current medications are enalapril, metoprolol, aspirin, furosemide, potassium, glyburide and pravastatin, but

he says that he has not been taking some of his medications recently. Physical examination reveals acrocyanosis and symmetric 3+ lower extremity edema. Point of maximal apical impulse is displaced to the left, and a holosystolic II/VI apical murmur is heard at the apex. Non-specific ST segment and T wave changes are present on ECG. The initial set of cardiac enzymes is positive. The patient continues to deteriorate, despite aggressive diuretic and vasodilator therapy. You perform an echocardiographic evaluation of left ventricular function and decide to proceed with pulmonary artery catheterization. Cardiac index (CI), total peripheral resistance (TPR) and left ventricular end-diastolic volume (LVEDV) are determined. Which of the following is most likely to present in this patient?

1. CI decreased, TPR decreased, LVEDV decreased
2. CI decreased, TPR increased, LVEDV decreased
3. CI decreased, TPR increased, LVEDV increased ✔
4. CI decreased, TPR increased, LVEDV normal
5. CI normal, TPR decreased, LVEDV increased

INCORRECT ✖

The correct answer is 3.

The clinical scenario described is consistent with systolic heart failure. Non-compliance with the treatment regimen and acute myocardial damage are the precipitating factors for the acute distress observed in this patient. It is important to know the basic pathophysiologic changes associated with heart failure. First, look at CI, a measure of cardiac output – it is always decreased in systolic heart failure. Next, look at LVEDV – it should be elevated in systolic heart failure, although it may be normal in pure diastolic heart failure **(Choice 4)**. TPR is elevated in systolic heart failure due to neurohumoral activation that includes sympathetic hyperactivity and activation of renin-angiotensin-aldosterone system.

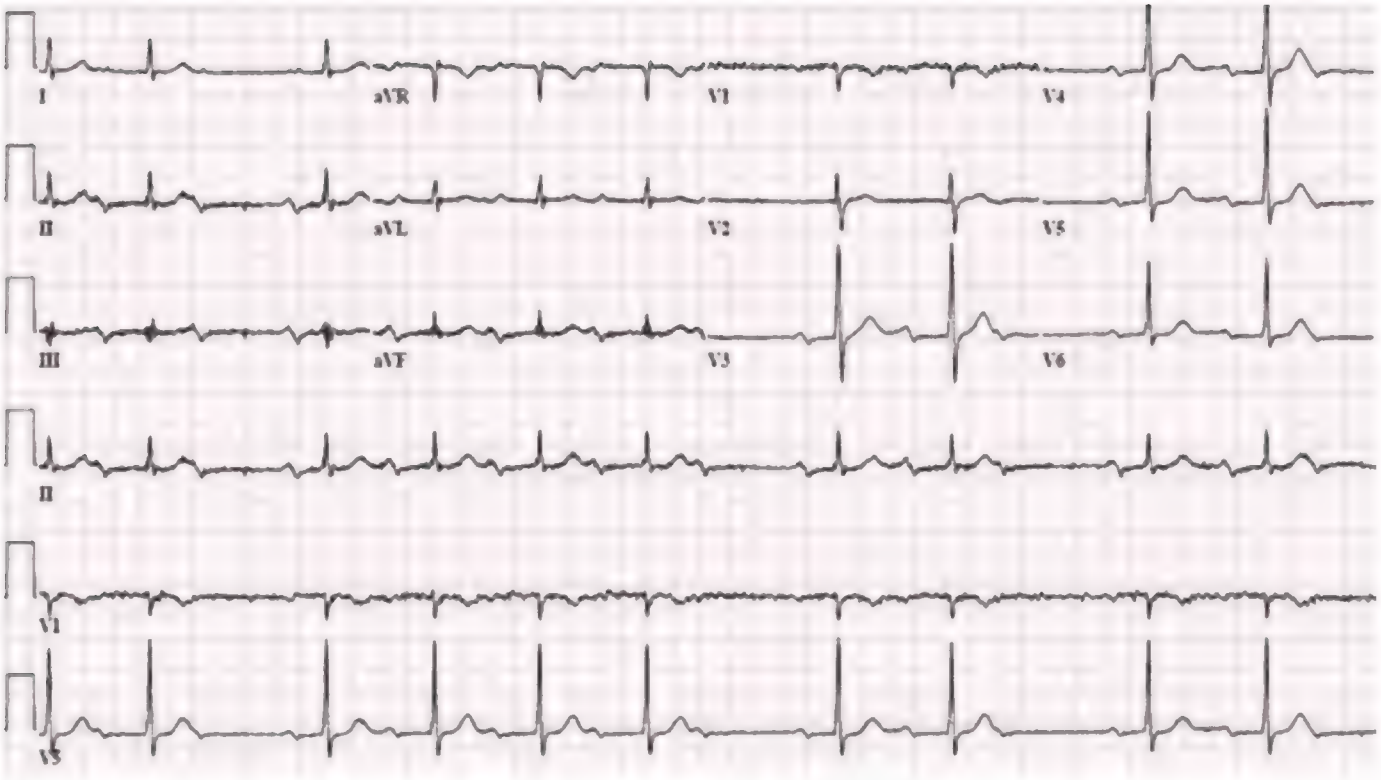
(Choices 1 & 2) Suboptimal left ventricular filling that may relatively reduce LVEDV can be due to blood redistribution with low TPR (e.g., anaphylaxis) or hypovolemia with elevated TPR (e.g., hemorrhage).

(Choice 5) Normal CI, elevated LVEDV and LVEDP, and decreased TPR can be caused sometimes by high-output heart failure.

21. Question **1 points**

A 42-year-old male with a past medical history of bladder cancer and recurrent hematuria presents to the emergency room after "passing out" when he got out of bed this morning. The patient says that he was standing up to urinate shortly after waking when he began feeling dizzy. Fortunately he

was able to return to his bed before losing consciousness for 7- 1 0 minutes. His EKG at the time of admission is shown below:



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Which of the following most likely accounts for the observed EKG changes?

1. Ventricular preexcitation
2. Impaired SA node automaticity
3. Impaired AV node conduction ✔
4. Atrial reentry
5. His bundle branch block

INCORRECT ✖

The correct answer is 3.

The above EKG demonstrates an irregular rhythm, with P waves preceding every QRS but with certain P waves not conducted. Closer examination reveals PR intervals that grow progressively longer between beats, leading up to a dropped beat. This pattern is consistent with second degree, Mobitz type I AV block (Wenckebach). Mobitz type I block is due to dysfunction at the AV node. Patients are generally asymptomatic, but in some cases the dropped beats cause hypoperfusion leading to syncope and/or angina.

(Choice 1) Ventricular preexcitation usually results in premature ventricular complexes (PVCs).

(Choice 2) Impaired SA node automaticity (sick sinus syndrome) most often results from fibrosis of the sinus node or disease of the SA nodal artery. Patients may present with bradycardia, lightheadedness, or syncope. On EKG, this often appears as tachycardia-bradycardia syndrome (bursts of atrial tachyarrhythmia followed by bradycardia).
(Choice 4) Atrial reentry leads to atrial tachycardia of abrupt onset and termination.
(Choice 5) Bundle branch block occurs below the AV node and impedes ventricular depolarization. The result is a prolonged ORS complex.

22. Question

1 points

A 65-year-old man comes to your office for a follow-up after his previous visits revealed inadequately controlled hypertension. He has no present complaints except difficulty walking uphill or climbing stairs, because of the pain in the right thigh, which makes him stop and rest. His past medical history includes stable angina, requiring coronary angioplasty and stenting 2 years ago; hypercholesterolemia; a 20-year history of hypertension; and a 10-year history of diabetes mellitus, type 2. His current medications are aspirin, metoprolol, hydrochlorothiazide, enalapril, amlodipine, pravastatin and glyburide. He smokes 1 Y, packs of cigarettes per day and does not consume alcohol. His blood pressure is 160/100 mm Hg in his right arm and 180/110 mmHg in his left arm. Which of the following findings will point to the potential cause of the resistant hypertension in this patient?

1. Increased pulsation of intercostal arteries
2. Continuous murmur in the paraumbilical area to the right ✔
3. Increased urinal excretion of vanillylmandelic acid (VMA)
4. High aldosterone/renin ratio
5. Increased 24-hour urinary free cortisol excretion

INCORRECT ✖

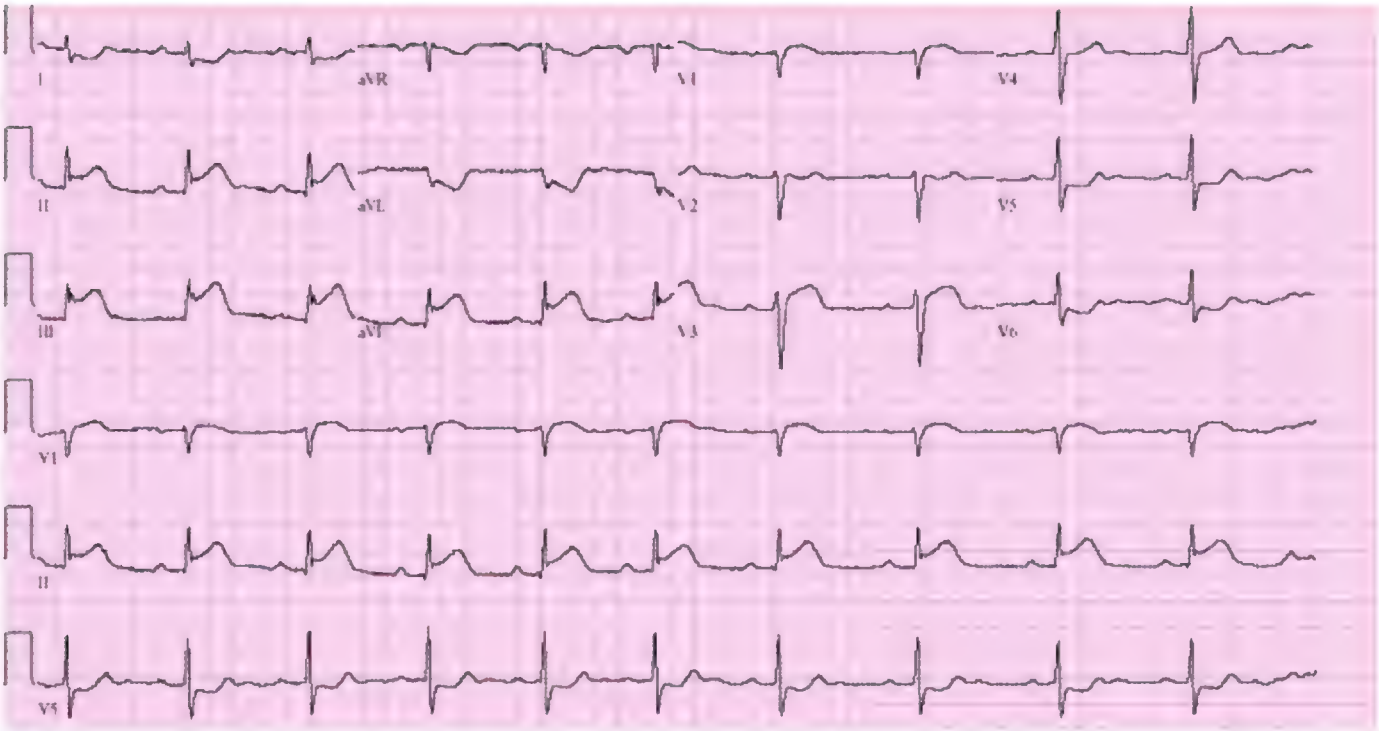
The correct answer is 2.

This clinical scenario demonstrates a patient with advanced atherosclerosis, having atherosclerotic lesions of multiple sites: Coronary atherosclerosis, intermittent claudication, a difference between right arm and left arm BP readings. He also has multiple risk factors for atherosclerosis, such as hypercholesterolemia, diabetes, smoking, and hypertension. Resistant hypertension in such a patient should make you suspect atherosclerotic narrowing of renal arteries. Continuous (systolic and diastolic) murmur in the periumbilical area, or in the flanks, is characteristic of renal artery stenosis; the diastolic component makes this

murmur more specific, compared to the systolic component alone. If you carefully auscultate the periumbilical area of such a patient with advanced atherosclerosis and resistant hypertension, you have a good chance to arrive at a correct diagnosis.
(Choices 1, & 3) The increased pulsation of intercostal arteries is typical for coarctation of the aorta. Urinary excretion of vanillylmandelic acid is increased in pheochromocytoma.
(Choice 4) A high aldosterone/renin ratio is characteristic for primary hyperaldosteronism.
(Choice 5) An increased 24-hour urinal free cortisol excretion is observed in Cushing's syndrome.

23. Question **1 points**

A 65-year-old Hispanic male is brought to the emergency room with severe substernal chest pain and diaphoresis that began suddenly 1 hour ago. He reports that his pain started while he was at rest and radiates to his left shoulder. The patient notes having vomited twice when the pain first began. Despite administration of 2 baby aspirins and 3 tablets of sublingual nitroglycerin, the pain persists. His initial EKG is shown below.



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On physical examination, the patient's temperature is 36.9°C (98.4°F), blood pressure is 110/80 mmHg, pulse is 60/min, and respirations are 18/min. S1 and S2 are normal, and an S4 is heard. The lungs are clear to auscultation. There is no jugular venous distension or pedal edema. Interventions to achieve which of the following goals would most improve this patient's long-term prognosis?

1. Decrease myocardial oxygen demand
2. Decrease blood coagulability

3. Restore coronary blood flow ✔
4. Prevent ischemia-induced arrhythmias
5. Prevent reperfusion myocardial injury

INCORRECT ✖

The correct answer is 3.

This patient is having an ST-elevation MI in the inferior distribution (leads II, III, and aVF), likely secondary to an occlusive thrombus. His long-term prognosis is most influenced by the duration of time that lapses before coronary blood flow is restored. The two primary options for restoring coronary blood flow are percutaneous transluminal coronary angioplasty (PTCA) and fibrinolysis. PTCA has been shown to have superior outcomes compared to fibrinolysis, and should therefore be the chosen reperfusion modality when available. Ideally, PTCA should be done with a "door-to-balloon" time of less than 90 minutes. When fibrinolytics are used, a "door-to-needle" time of 30 minutes is the goal.

(Choice 1) Myocardial oxygen demand is determined by heart rate, preload, contractility, and afterload. Medications such as nitrates and β-blockers affect these parameters and can be used to reduce myocardial oxygen demand. However, these treatments are more effective in angina as opposed to STEMI, as this patient cannot meet much myocardial oxygen demand since there is no coronary blood flow.

(Choice 2) Decreasing blood coagulability with medications such as aspirin, clopidogrel, and/or heparin is part of the management of STEMI. However, these medications only stop the thrombus from progressing. In contrast, PTCA and fibrinolysis disrupt the thrombus that is occluding coronary blood flow.

(Choice 4) At one time, lidocaine was recommended as prophylaxis against ischemia-related arrhythmias, but this is no longer the case. Arrhythmias should be treated only as they arise.

(Choice 5) Reperfusion injury can occur after PTCA or fibrinolysis, potentially causing continued myocyte death. However, there are no medications currently available to inhibit this process, and the benefits of reperfusion far outweigh the consequences of reperfusion injury.

24. Question **1 points**

A 43-year-old man is hospitalized with chest pain, lightheadedness and nausea. He describes the pain as dull and non-radiating. He has never had chest pain before, but does report occasional episodes of dyspnea and coughing. His medical history is significant for eczema. He is not presently taking any medications. His family history is significant for prostate cancer in his father and rheumatoid arthritis in his mother. He does not smoke or consume alcohol. The patient is admitted to the hospital and is given aspirin, low-molecular weight heparin, metoprolol and captopril. On day 2 of his hospitalization he complains of shortness of breath. Physical examination reveals

prolonged expirations and bilateral wheezes. There are no crackles. You estimate the jugular venous pressure to be 7 cm with the patient's head elevated at 45 degrees. Which of the following is most likely responsible for this patient's current respiratory symptoms?

1. Pericarditis
2. Bronchial infection
3. Recurrent myocardial ischemia
4. Right ventricular infarction
5. Drug side effect ✔

INCORRECT ✖

The correct answer is 5.

This patient was admitted to the hospital with chest pain concerning for acute coronary syndrome. Shortly after being started on several medications, he developed shortness of breath and prolonged expirations. While the differential diagnosis for dyspnea is broad, we can take several clues from the vignette to point us toward the correct diagnosis. First, the patient has a history of intermittent dyspnea and coughing. Given his history of eczema, these symptoms may represent mild undiagnosed intermittent asthma.

Metoprolol is a competitive, β-1 selective adrenergic antagonist, but it can also block β-2 receptors in the bronchial tree. (This β-2 effect is more prominent at higher doses.) In patients with reactive airway disease, β-2 blockade causes bronchoconstriction with symptoms like wheezing, cough and prolonged expiration. Thus, while β-1 selective adrenergic blockers are preferred over nonselective agents in patients with asthma and COPD, even these agents should be used with caution as the above vignette demonstrates.

(Choice 1) Post-infarction pericarditis is typically seen 2 to 5 days after a myocardial infarction. Autoimmune pericarditis is seen one to several weeks after an acute myocardial infarction or open-heart surgery.

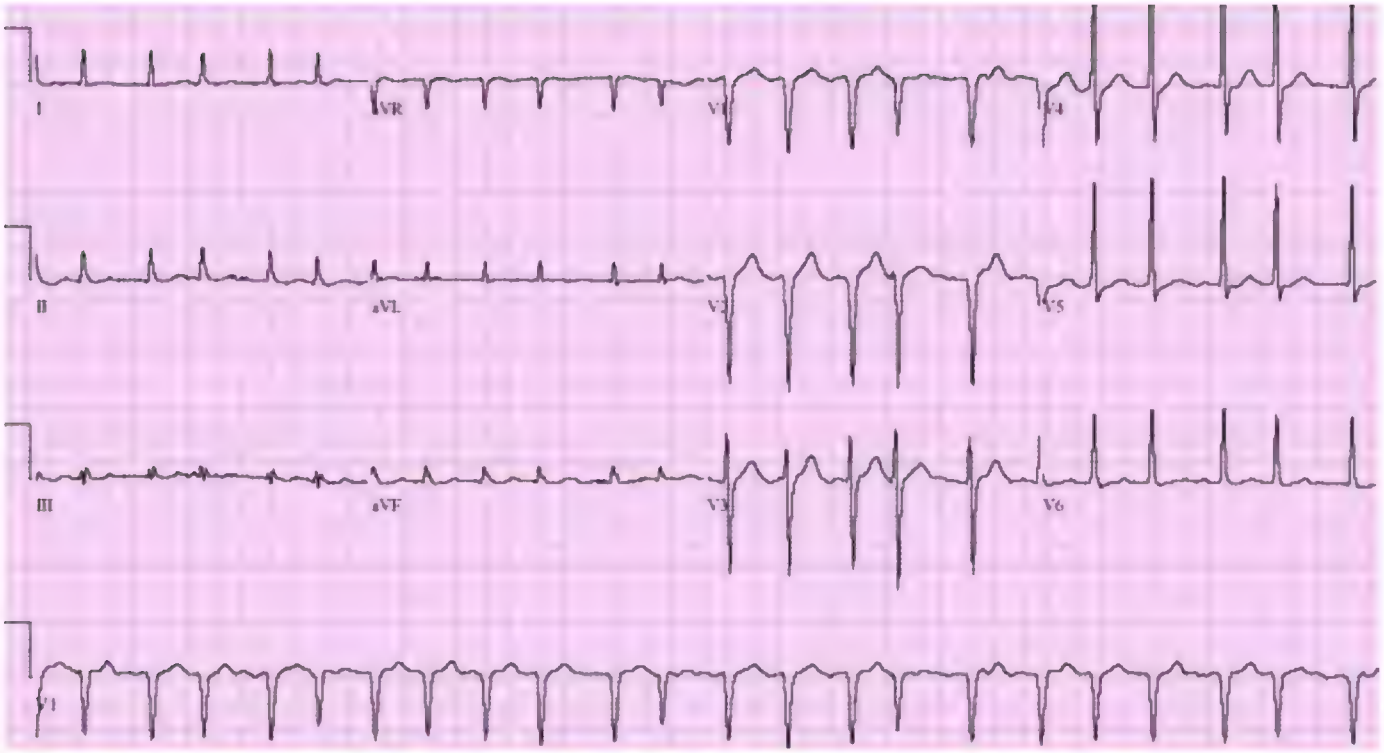
(Choice 2) Bronchitis is characterized by shortness of breath, productive cough and fever. This patient does not have fever or productive cough, making this diagnosis less likely.

(Choice 3) Recurrent myocardial ischemia would likely manifest with pain, but symptoms like nausea and diaphoresis are sometimes the most prominent. Breathlessness due to acute heart failure can occur secondary to myocardial infarction. While wheezing may be present ("cardiac asthma"), crackles and elevated jugular venous pressure would also be expected.

(Choice 4) Inferior wall infarctions may damage the right ventricle and present with hypotension and elevated venous pressure, but wheezing would not be expected.

25. Question **1 points**

A 64-year-old male with a history of hypertension presents with general malaise and a 'funny' heart rhythm for the past 2 weeks. He had an echocardiogram done last year, which revealed mild left atrial dilatation and left ventricular hypertrophy. He has been taking hydrochlorothiazide for hypertension. His blood pressure at today's visit is 180/98 mm Hg. An EKG is obtained and is shown below.



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Which of the following is the most appropriate treatment for this patient?

1. Immediate cardioversion
2. Lidocaine
3. Adenosine
4. Carotid massage
5. Diltiazem ✔

INCORRECT ✖

The correct answer is 5.

Atrial fibrillation (AF) is a cardiac arrhythmia characterized by lack of organized atrial activity. Hypertension is the most common cause. Other causes include valvular heart disease, myocardial infarction, heart failure, hyperthyroidism, and alcohol. AF is identified on EKG by absent P waves, an irregularly irregular rate, and a narrow QRS complex. This patient has AF with rapid ventricular response, as his heart rate is approximately 140 beats/minute. The treatment of AF depends on a number of factors, including whether the patient is hemodynamically stable and the length of time spent in AF. In patients who are

hemodynamically unstable (low BP, altered mental status), immediate cardioversion is indicated. If the patient is hemodynamically stable-as is the case in this vignette-then the duration of AF must be considered. If AF has been present for 48 hours, there is a high risk of thromboembolism with cardioversion; such patients should be treated with rate control and 3-4 weeks of anticoagulation before cardioversion is attempted. Rate control is most often achieved with β-blockers or calcium channel blockers. Diltiazem, a calcium channel blocker, is the only rate-controlling agent listed above, and is the correct answer.
(Choice 1) Atrial fibrillation has been present for >48 hours in this stable patient, making immediate cardioversion inappropriate.
(Choice 2) Lidocaine is a class Ib antiarrhythmic. It is used to treat ventricular tachycardia but not atrial arrhythmias.
(Choices 3 & 4) Carotid massage and adenosine may be used to manage patients with supraventricular tachycardia (SVT). Carotid massage is a vagal maneuver that slows the heart rate and may terminate SVT. Adenosine works in SVT by causing transient AV node blockade, which allows identification of the rhythm and terminates certain forms of SVT.

26. Question

1 points

A 53-year-old male is admitted to the hospital with a 2-week history of fatigue and decreased exercise tolerance. He says he can hardly climb two flights of stairs without getting dyspneic. He denies palpitations or chest pain. His past medical history is insignificant, and a routine check-up 6 months ago was normal. He admits two episodes of binge drinking during the last month, but says that he 'got it under control'. He is currently not taking any medications. His blood pressure is 150/90 mm Hg and heart rate is 130/min, irregular. Lungs are clear on auscultation. ECG does not reveal P waves. Echocardiography shows significant left ventricular dilation with an ejection fraction of 35% and mitral regurgitation (1 +). Which of the following intervention will most likely improve the left ventricular function in this patient?

1. Preload optimization
2. Decreasing afterload
3. Rate or rhythm control ✔
4. Inotropic support
5. Valve surgery

INCORRECT ✖

The correct answer is 3.

Prolonged, tachy systolic atrial fibrillation causes significant left ventricular (LV) dilation and a depressed ejection fraction. LV dysfunction results from tachycardia, neurohumoral

activation, absence of an atrial 'kick' (that accounts for up to 25% of LV end-diastolic volume), and atrial-ventricular desynchronization. Controlling the rhythm in such patients usually improves the LV function significantly (sometimes even dramatically).
(Choices 1, 2 & 4) Preload optimization, decreasing afterload, and inotropic support are less urgent in this case and would be less beneficial without first controlling the rhythm or rate.
(Choice 5) Slight mitral regurgitation is a secondary event explained by LV dilation.

27. Question

1 points

A 48-year-old male presents to your office complaining of progressive exertional dyspnea. It has become especially bothersome over the past two months. Presently, he becomes short of breath after climbing one flight of stairs. He denies any significant problems in the past. He is not taking any medications and he denies smoking or drinking alcohol. His temperature is 37.2 °C (98.9 °F), pulse is 78/min, blood pressure is 130/75 mm of Hg and respirations are 14/min. Chest examination reveals a harsh systolic murmur that is best heard at the right second intercostal space with radiation along the carotid arteries. An S4 is heard at the apex. Based on these findings, what is the most likely cause of this patient's symptoms?

1. Hypertrophic cardiomyopathy
2. Myxomatous valve degeneration
3. Rheumatic heart disease
4. Bicuspid aortic valve ✔
5. Senile calcific aortic stenosis

INCORRECT ✖

The correct answer is 4.

This patient appears to be suffering from congestive heart failure as a consequence of aortic stenosis. A harsh systolic murmur at the right upper sternal border with radiation to the carotid arteries is a classic description of the murmur caused by aortic stenosis. The S4 occurs as the result of left atrial kick against a stiff left ventricle. In aortic stenosis, the high resistance generated by the stenosed aortic valve causes concentric hypertrophy and stiffening of the left ventricle, resulting in the S4. The three most common causes or aortic stenosis in the general population are senile calcific aortic stenosis, bicuspid aortic valve, and rheumatic heart disease. The most important hint to the underlying etiology of this patient's aortic stenosis is his relatively young age. A bicuspid aortic valve is the cause of aortic stenosis in the majority of patients under 70 years old, so this is the most likely cause of this patient's aortic stenosis.

(Choice 1) The murmur of hypertrophic cardiomyopathy can be easily confused with that of aortic stenosis. Both entities can cause a systolic crescendo-decrescendo murmur and an S4. However, the murmur of hypertrophic cardiomyopathy is usually best appreciated in the lower left sternal border and it does not typically radiate to the carotids.
(Choice 2) Myxomatous valve degeneration is the typical pathologic entity that causes mitral valve prolapse.
(Choice 3) As mentioned above, rheumatic heart disease can be a cause of aortic stenosis. However, it is a much less common cause than either senile calcific aortic stenosis or a bicuspid aortic valve.
(Choice 5) Senile calcific aortic stenosis is the most common cause of aortic stenosis in patients who are older than 70 years old. As people age, the aortic valve can accumulate calcium, causing stenosis.

28. Question

1 points

A 47-year-old female presents with occasional episodes of nocturnal substernal chest pain that wakes her up during sleep. The pain episodes last 15-20 minutes and resolve spontaneously. She denies any illicit drug use. She leads a sedentary lifestyle but states that she can climb two flights of stairs without any discomfort. She has no history of hypertension or diabetes. Her pulse is 75/min and regular, blood pressure is 134/70 mm Hg and respirations are 14/min. Extended ambulatory ECG monitoring reveals transient ST segment elevation in leads I, aVL, and V4-V6 during the episodes. Which of the following is the best treatment for this patient?

1. Diltiazem ✔
2. Propranolol
3. Aspirin
4. Ezetimibe
5. Digoxin

INCORRECT ✖

The correct answer is 1.

This patient has variant angina (or Prinzmetal's angina), which causes chest pain by coronary vasospasm. It typically occurs in young females, and the greatest risk factor for variant angina is smoking. Aside from smoking, affected patients often lack cardiovascular risk factors. The episodes characteristically occur at night (from midnight to 8 am) and can be associated with transient ST elevations on ECG. The treatment of this condition involves

elimination of risk factors such as smoking, as well as pharmacologic therapy with calcium channel blockers or nitrates. These medications work in variant angina by promoting vasodilation and preventing vasoconstriction.
(Choice 2) Nonselective β-Blockers such as propranolol should be avoided in variant angina because β-2 receptor inhibition can lead to worsened coronary vasospasm.
(Choice 3) Aspirin should also be avoided in variant angina because it causes prostacyclin inhibition, which may promote coronary vasospasm.
(Choice 4) Patients with variant angina often lack cardiovascular risk factors such as hypercholesterolemia. In the absence of lipid abnormalities, variant angina management does not entail cholesterol lowering medications. If this patient's lipids were found to be abnormal on a screening test, then lipid-lowering medications could be considered.
(Choice 5) Digoxin is typically used to increase contractility in patients with congestive heart failure or as a rate control agent in patients with atrial fibrillation or flutter, none of which are a problem for this patient.

29. Question **1 points**

A 36-year-old male patient, who has a history of Marfan's syndrome, presents with sudden onset of severe central tearing chest pain radiating to his back. The pain is 9/10 in severity and is unrelated to exertion. He denies any history of alcohol or tobacco use. Measurement of his BP shows a difference of 35 mm Hg between his two arms. Chest auscultation reveals clear lung sounds and a mid-systolic click. What is the most appropriate next diagnostic step in the management of this patient?

1. Transesophageal echocardiography ✔
2. Transthoracic echocardiogram
3. Cardiac enzymes
4. Coronary angiogram
5. Ventilation-perfusion scan

INCORRECT ✖
The correct answer is 1.
This patient is most likely suffering from acute aortic dissection, for which transesophageal echocardiography or computed tomography of the chest are the diagnostic studies of choice. The collagen abnormalities of Marfan's syndrome predispose patients to both aortic dissection and mitral valve prolapse (as evidenced by the mid-systolic click on the patient's

cardiac exam). Tearing pain with radiation to the back and a difference in BP of greater than 30 mmHg between the two arms are important clinical clues to the presence of aortic dissection.
(Choice 2) TEE, CT and MRI are much more sensitive than TIE for the diagnosis of aortic dissection. The distal ascending, transverse and descending aorta cannot be adequately visualized with TIE.
(Choice 3) Cardiac enzymes are crucial to the diagnosis of myocardial infarction, and it is reasonable to draw them on almost any patient with chest pain. However, this patient's age, symptoms and history of Marfan's make aortic dissection more likely than myocardial infarction (MI). Therefore, TEE is the most appropriate next step.
(Choice 4) Coronary angiography is typically performed as quickly as possible in patients with an ST elevation MI and within the first 48 hours in patients with unstable Angina/NSTEMI. As discussed above, MI is not the most likely diagnosis in this patient. Even if there were a high suspicion for MI, ECG and cardiac enzymes should precede coronary angiography.
(Choice 5) A ventilation/perfusion scan is indicated when pulmonary embolism is suspected. Pulmonary embolism (PE) belongs in the differential for life threatening causes of chest pain. However, the chest pain of PE is typically pleuritic in nature; tearing pain with radiation to the back and a BP differential between the arms is far more suggestive of aortic dissection.

30. Question

1 points

A 55-year-old male presents to your office with a 6-month history of periodic substernal pressure. He experiences this pressure while walking uphill or climbing two flights of stairs. His past medical history is insignificant. He smokes 1 pack a day and consumes alcohol occasionally. His blood pressure is 160/90 mmHg and heart rate is 75/min. Resting ECG is normal. You suspect stable angina and order an ECG stress test that reveals horizontal ST segment depression in leads II, 111, and aVF at submaximal heart rate. What is the best medication to treat this patient's condition?

1. Isosorbide dinitrate
2. Verapamil
3. Amlodipine
4. Metoprolol ✔
5. Enalapril

INCORRECT ✖

The correct answer is 4.
This patient presents with typical exertional angina confirmed with ECG stress testing. Another important finding in this patient is hypertension. A β-blocker is probably the best initial treatment for this patient, because it would increase the threshold for the development of an anginal episode and control the hypertension. Besides that, it is believed that β-blockers are cardioprotective; they can potentially reduce the risk of major cardiovascular events and arrhythmic episodes by decreasing the sympathetic output to the heart.
(Choice 1) can control anginal episodes, but they are not good antihypertensive agents. If the effect of a β-blocker is not satisfactory, a nitrate can be added to the regimen.
(Choices 2 & 3) Calcium antagonists are considered if β-blockers are contraindicated or poorly tolerated.
(Choice 5) is an antihypertensive agent without anti-anginal activity. There is some evidence that ACE inhibitors may decrease the risk of major cardiovascular events in patients with ischemic heart disease not only by lowering blood pressure, but also affecting the development of atherosclerotic plaque, but this evidence is controversial.

31. Question

1 points

A 45-year-old man presents to the emergency department because of dyspnea, fatigue, poor appetite and weight gain over the past several weeks. He says that about four weeks ago he began to develop worsening shortness of breath with exertion and more recently has been waking at night with breathlessness. He also notes that it is sometimes difficult for him to open his eyes in the morning due to facial edema. He has no significant past medical history and he takes no medications. On physical examination, his blood pressure is 200/120 mmHg and his heart rate is 100/min. You note generalized bodily edema and distention of his jugular veins while he is sitting upright. On lung auscultation you hear bibasilar rales. Urinalysis shows trace protein, no nitrites, trace leukocyte esterase, 50+ red blood cells and occasional neutrophils. Which of the following is the most likely cause of this patient's edema?

1. Renal hypoperfusion
2. Hypoalbuminemia
3. Extensive glomerular damage ✔
4. Portal hypertension
5. Hypothyroidism

INCORRECT ✖

The correct answer is 3.
Peripheral edema can result from a number of etiologies including organ failure (cardiac, hepatic, or renal), hypoalbuminemia (secondary to nephrotic syndrome, malnutrition, or liver disease), and venous insufficiency. The patient described above has anasarca, or generalized edema, characterized by pulmonary edema and ascites in addition to swollen extremities. Organ failure and/or hypoalbuminemia are potential causes of anasarca. Based on the information presented in the vignette, acute glomerulonephritis appears to be the unifying diagnosis here. In glomerulonephritis, edema results from glomerular damage and a decreased glomerular filtration rate (GFR).
In glomerulonephritis, the urine sediment will reveal red blood cells, red blood cell casts, and might contain white blood cells and protein as well. Patients may have significant proteinuria, which contributes to their edema. (This patient has only trace protein on his urinalysis meaning that the majority of his edema is secondary to a decreased GFR.) Decreased GFR is the cause of edema in patients with end-stage renal disease as well.
(Choice 1) Renal hypoperfusion can occur in heart failure (decreased cardiac output), which in turn promotes increased renal sodium reabsorption and edema. Urinalysis would not show significant red blood cells or casts.
(Choice 2) Hypoalbuminemia can result from excessive albumin loss (as in nephrotic syndrome) or decreased albumin synthesis (as in cirrhosis or severe malnutrition). While this patient clearly has renal disease, he does not have significant proteinuria to explain his presentation.
(Choice 4) Cirrhosis can cause portal hypertension as the scarred liver limits blood flow through the sinusoidal network. Patients with cirrhosis typically have ascites out of proportion to edema in other tissues, plus other signs of chronic liver disease like spider angiomata, palmar erythema, and ca put medusa.
(Choice 5) While hypothyroidism can cause pretibial edema, it is not a common cause of anasarca.

32. Question

1 points

A 45-year-old white male presents to the ER after an episode of syncope. His medical history is unremarkable except for an upper respiratory infection one week ago. On physical examination, his temperature is 37.2°C (99°F), pulse is 90/min, blood pressure is 100/60 mmHg and respirations are 13/min. His neck veins are distended and his heart sounds are distant. His lungs are clear to auscultation bilaterally. Chest x-ray reveals small bilateral pleural effusions and an enlarged cardiac silhouette. Which of the following EKG findings is fairly specific for his condition?

1. Prolonged 'PR' interval
2. Presence of 'F' waves
3. Electrical alternans ✔
4. Presence of 'delta' wave

5. New-onset right bundle branch block

INCORRECT ✖

The correct answer is 3.

This patient has a pericardial effusion, which often causes electrical alternans on EKG. His recent upper respiratory infection is a clue towards the diagnosis, as pericardial effusions are often secondary to viral pericarditis. Accompanying pleural effusions may be found as well. Electrical alternans describes QRS complexes whose amplitudes vary from beat to beat on EKG. It is thought to result from the heart's swinging back and forth within an increased quantity of pericardial fluid. Jugular venous distention, muffled heart sounds and borderline blood pressure indicate developing cardiac tamponade. Echocardiography can confirm the presence of pericardial effusion.

(Choice 1) The 'PR' interval is prolonged in first degree heart block, a condition that is usually asymptomatic and requires no treatment.

(Choice 2) The presence of 'F' waves, or flutter waves, is diagnostic of atrial flutter. Jugular venous distention and hypotension can develop if the heart rate is rapid enough, but this patient's rate is only 90.

(Choice 4) A 'delta' wave is an upsloping just before the QRS complex that occurs in patients with an accessory conduction pathway, like in Wolf-Parkinson-White syndrome. It is not associated with pericardial effusion.

(Choice 5) New-onset right bundle branch block can sometimes be seen in pulmonary embolism. Pulmonary emboli usually cause tachypnea and/or tachycardia.

33. Question

1 points

A 56-year-old man presents to the emergency department with dyspnea. He describes waking up during the night with difficulty breathing and chest pain that kept him from falling back to sleep. He has never had these symptoms before. His past medical history is significant for long-standing hypertension and non-compliance with his antihypertensive therapy. He has smoked a pack of cigarettes per day for the past 30 years. On physical examination, his blood pressure is 170/100 mm Hg and his heart rate is 120/min and regular. Lung auscultation reveals bibasilar rales and scattered wheezes. Which of the following is most likely to relieve this patient's dyspnea?

1. Metoprolol
2. Hydralazine
3. Salmeterol
4. Dopamine
5. Amiodarone

6. Nitroglycerin ✔

INCORRECT ✖

The correct answer is 6.

This patient presents with paroxysmal nocturnal dyspnea in the setting of long-standing hypertension and a pulmonary exam concerning for cardiogenic pulmonary edema. He has likely developed diastolic dysfunction (impaired ventricular relaxation) from his long-standing hypertension and is now in left ventricular failure. Nitroglycerin (NTG), either IV, sublingual, or topical, relieves the dyspnea and tachycardia associated with cardiogenic pulmonary edema by rapidly reducing preload. Several studies have suggested that it works quicker than morphine or loop diuretics. NTG is not part of the long-term management for patients with heart failure but can be beneficial in acutely alleviating symptoms. It should be used cautiously in patients with hypotension. Beyond NTG, loop diuretics are the mainstay of therapy for decompensated heart failure and principally work by reducing total body volume.

(Choice 1) β-blockers are tremendously efficacious in treating chronic heart failure, and have been shown to significantly improve long-term morbidity and mortality in affected patients. However, β-blockers are negative inotropes and may acutely worsen heart failure symptoms.

(Choice 2) Hydralazine given in combination with an oral nitrate has proven efficacy for treating African American men with heart failure. However, hydralazine given alone will not alleviate symptoms as quickly as NTG.

(Choice 3) Salmeterol is a long-acting β2-adrenergic agonist used in the chronic treatment of asthma and bronchodilator-responsive COPD. Because it has a slow onset, salmeterol is not beneficial in the treatment of asthma or COPD exacerbations. Regardless, this patient's wheezing is due to pulmonary edema, not asthma, so salmeterol is not the appropriate therapy here.

(Choice 4) At moderate doses (3-10 mcg/kg/min), dopamine stimulates myocardial β-receptors and increases myocardial contractility. However, at these doses, dopamine is also arrhythmogenic and may worsen heart failure.

(Choice 5) Amiodarone can be used to treat atrial fibrillation or ventricular tachycardia in patients with heart failure, but it is not a treatment for pulmonary edema.

34. Question **1 points**

A 56-year-old white male presents to his primary care physician for follow-up evaluation of high blood pressure noted on each of three prior visits over a period of 6 months (systolic blood pressure ranging 140-145, diastolic blood pressure ranging 90-96 mm Hg). He has smoked a pack of cigarettes per day for the past 20 years and takes 5-6 drinks of alcohol daily. He has no other medical problems and takes no medications. There is no family history of diabetes mellitus, coronary artery disease, hyperlipidemia or hypertension. On physical examination today, his blood

pressure is 146/97 mm Hg and pulse is 80/min. The remainder of the exam is unremarkable. Which of the following nonpharmacologic interventions would be expected to have the greatest impact on his high blood pressure?

1. Smoking cessation
2. Increased consumption of complex carbohydrates
3. Increased calcium consumption
4. Decreased alcohol intake ✔
5. Decreased consumption of animal protein

INCORRECT ✖

The correct answer is 4.

This patient has had multiple blood pressure readings greater than 140/90 over a period of months, and therefore meets the criteria for stage I hypertension. In such patients, it is reasonable to enact a trial of lifestyle modifications to reduce blood pressure before resorting to medications. The most effective lifestyle intervention for reducing blood pressure is decreased consumption of alcohol. It is recommended that males consume less than 2 drinks daily, and women less than 1.

(Choice 1) There is no question that smoking cessation reduces the risk of cardiovascular disease in patients with hypertension. However, in terms of improving hypertension itself, abstinence from alcohol has a greater effect.

(Choice 2) Diets rich in fruits, vegetables, and whole grains have been shown to aid weight loss and may therefore indirectly help lower blood pressure. Decreasing alcohol consumption would be expected to have a more dramatic effect, however.

(Choice 3) Patients with a low dietary intake of calcium do have a higher risk of developing hypertension, but giving these patients calcium supplements has not been shown to substantially impact blood pressure.

(Choice 5) Vegetarians tend to have less hypertension than meat-eaters, but there is not strong data to suggest that eliminating animal protein from the diet is an effective means of controlling hypertension.

35. Question **1 points**

A 63-year-old female presents to your office for a routine check-up. She has no present complaints. Her past medical history includes OM, type 2, and hypertension. Her current medications include glyburide and atenolol. She does not smoke. She drinks 2-3 glasses of wine 1-2 times a week. Three consecutive BP measurements were in the range of 138-14 2/87-90 mm Hg. Physical

examination is within normal limits. Her recent fasting glucose level was 250 mg/dl. ECG recorded 1 month ago showed left ventricular hypertrophy. Which statement about the BP control in this patient is the most accurate?

1. BP is within acceptable range
2. BP is within optimal range
3. It is better to keep systolic pressure less than 130 mm Hg to slow end-organ damage ✔
4. Diastolic BP is within acceptable range, but systolic is not
5. Systolic BP is within acceptable range, but diastolic is not

INCORRECT ✖

The correct answer is 3.

Traditionally a goal, blood pressure is considered to be below 140/90 mmHg. But it is recently recognized that BP needs more tight control in diabetics and patients with chronic renal failure. These two groups of patients are especially sensitive to high BP, that's why the values of systolic BP for these patients should be kept lower than 130 mm Hg and diastolic BP lower than 80 mm Hg to prevent end organ damage.

(Choices 1, 4 & 5) Blood pressure could be considered in acceptable range if the patient was not diabetic. According to JNC- 7 report (JNC stands for Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) BP is considered optimal when it is below 120/80 mmHg **(Choice 2)**. In this patient both systolic and diastolic BP are above the goal values.

36. Question

1 points

A 21 year old man is brought by his roommate to the emergency department because of abrupt onset of shortness of breath, mild chest pain, and a sensation of rapid heart beating. The patient says that in the past he had similar episodes, which resolved with the Valsalva maneuver or breath holding. This time, these measures were unsuccessful. He does not take any medication and is otherwise in good health. An ECG documents supraventricular tachycardia with a pulse of 200/min. Under ECG monitoring, gentle massage over the right carotid sinus is attempted, but the attack does not cease.

Which of the following is the most appropriate next step in treatment?

1. Further carotid sinus massage

2. IV lidocaine
3. IV procainamide
4. IV verapamil ✔
5. Oral verapamil

INCORRECT ✖

The correct answer is 4.

Paroxysmal supraventricular tachycardia is the most common paroxysmal arrhythmia with a rapid heart rate. It is often associated with a perfectly normal heart. Depending on heart rate, manifestations may vary from a subjective sensation of increased heart rate to mild chest pain, shortness of breath, or syncope. The pulse is usually between 160 and 220/min. Patients may be instructed to carry out maneuvers that stimulate the vagal nerve (e.g., Valsalva maneuver, breath holding, and arm and body stretching) and may succeed in interrupting the attacks. Carotid sinus massage should be performed for I 0-20 seconds on the patient in a semirecumbent position and only on one side. Presence of carotid bruits is an absolute contraindication to carotid sinus massage. IV verapamil (a calcium channel blocker) or IV adenosine is the treatment of choice once other nonpharmacologic measures have been tried.

(Choice 1) would most probably be unsuccessful.

(Choice 2) is reserved for treatment of ventricular tachyarrhythmias, especially in the setting of acute myocardial infarction.

(Choice 3) is not a choice for treatment of supraventricular tachycardia. Oral procainamide may be used for prevention of attacks as an alternative to digoxin, verapamil, or β-blockers.

(Choice 5) Oral verapamil, 80-120mg/4-6 hours, can be tried on patients with mild symptoms, but this is not the case in this patient.

37. Question **1 points**

A 45 year old African man is taken to the emergency department because he is vomiting fresh blood. His temperature is 37 °C (98.6 °F), blood pressure is 65/30 mm Hg, pulse is 120/min, and respirations are 24/min. The patient is stabilized, and then taken for emergency endoscopy. The source of bleeding is a tortuous vein near the gastroesophageal junction. The bleeding is successfully stopped by banding of the vessel. Which of the following is the most likely underlying condition predisposing this patient for this complication?

1. Alcoholism ✔
2. $Alpha_1$, -anti trypsin deficiency

3. Hemochromatosis
4. Hepatitis A infection
5. Hepatitis B infection

INCORRECT ✖

The correct answer is 1.

The patient has a bleeding esophageal varix. These are dilated vessels that usually develop when cirrhosis blocks blood flow from the portal venous system through the liver, and back to the systemic circulation. Hypersplenism and arteriovenous malformations that markedly increase blood flow in the portal system can also cause esophageal varices, even in the absence of cirrhosis. Although any type of cirrhosis can potentially cause bleeding esophageal varices, you should be aware that the most common cause is alcoholism, possibly because it is both very common and may be accompanied by gastritis, which makes it easier for the varices to start to bleed. While individual incidents of bleeding varices can often be handled by either sclerotherapy or endoscopic banding of the bleeding vessel, the long-term prognosis remains poor for these patients, who often eventually either exsanguinate or die of other complications of advanced cirrhosis.

(Choice 2) is a rare cause of cirrhosis.

(Choice 3) is much less common than alcoholism as a cause of cirrhosis.

(Choice 4) may cause fulminant hepatic failure but does not cause cirrhosis.

(Choice 5) is also a relatively common cause of cirrhosis, but it is not as strongly linked to bleeding varices as is alcoholism. In real life, coexistent alcoholism and hepatitis B infection are common.

38. Question

1 points

A 32 year old man with AIDS develops right-sided weakness over the course of 1 week. He is on a combined drug regimen of zidovudine (AZT) and a protease inhibitor, and his CD4 cell count is 190 cells/mL. MRI of the brain reveals a single 2-cm mass in the left cerebral white matter that appears as an area of low signal surrounded by a rim of contrast enhancement ("ring-enhancing lesion"). A trial of sulfadiazine and pyrimethamine is started. Three weeks after beginning this treatment, the patient's neurologic status is unchanged, and imaging studies show that the lesion has not regressed. Which of the following is the most likely diagnosis?

1. Cryptococcal meningoencephalitis
2. Glioblastoma multiforme (GBM)
3. Metastatic tumor

4. Primary brain lymphoma ✔

5. Toxoplasma abscess

INCORRECT ✖

The correct answer is 4.

The two most common causes of intracranial masses in AIDS patients are cerebral toxoplasmosis and primary brain lymphoma, both of which usually manifest as ring-enhancing lesions on CT or MRI. The central nonenhancing area of the lesion consists of necrosis, whereas the peripheral rim is due to viable tissue, inflammatory or neoplastic. A single ring-enhancing lesion in an AIDS patient is treated with a full course of anti-Toxoplasma agents, e.g., sulfadiazine and pyrimethamine. If there is no response following 3 weeks of therapy, an alternative diagnosis of primary brain lymphoma is investigated, and a brain biopsy is performed, if possible, to confirm the clinical diagnosis.

(Choice 1) is a frequent opportunistic infection associated with AIDS. It manifests with diffuse involvement of the leptomeninges, not with an intracerebral space-occupying lesion. The patient is severely ill and may become rapidly comatose, although localizing signs (meningismus) maybe mild.

(Choice 2) may also give rise to a nonenhancing lesion on MRI, but its incidence is not increased in AIDS patients compared with immune competent individuals. GBM would be unusual in a young adult.

(Choice 3) is sometimes associated with the same MRI appearance as abscess or GBM. In an AIDS patient, however, metastases occur much less frequently than toxoplasmosis or lymphoma. Furthermore, metastases are usually multiple and located at the gray-white matter junction.

(Choice 5) responds to sulfadiazine and pyrimethamine treatment and shows signs of shrinkage on follow-up MRI.

39. Question **1 points**

A 68 year old woman complains of 2 days of cough and purulent sputum and right-sided chest pain exacerbated by breathing. She has had middle back pain unassociated with trauma for the past 2 months. One month ago, she was hospitalized briefly for pneumonia. On physical examination, her temperature is 39.0 C (102.2 F), blood pressure is 110/80 mm Hg, pulse is 98/min, and respirations are 28/min. There are crackles and egophony over the right lower lung field. There is no occult blood in the stool. Blood tests show a white blood cell count of 16,000/mm^3, a hematocrit of 18%, and a platelet count of 189,000/mm^3. The mean corpuscular volume is 82 μm^3. A chest x-ray film shows consolidation of the right middle and lower lobes, diffuse osteopenia, and multiple lytic lesions of the ribs and thoracic spine. Which of the following is the most likely laboratory finding?

1. Decreased serum ferritin
2. Elevated serum protein ✔
3. Hyperphosphatemia
4. Hypertriglyceridemia
5. Hypocalcemia

INCORRECT ✖

The correct answer is 2.

This case describes the presentation of multiple myeloma, a plasma cell dyscrasia, characterized by multiple bone marrow tumor foci. Multiple myeloma is associated with osteomalacia, hypercalcemia, and normochromic, normocytic anemia. Susceptibility to infections occurs because of depression of immunoglobulin levels. Pneumonia and pyelonephritis are the most common types of bacterial infection. Elevated serum protein is caused by clonal overproduction of immunoglobulin.

(Choice 1) Patients often are anemic because of bone marrow suppression of erythrocyte production. The iron level is not affected. In addition, this patient's mean corpuscular volume is greater than 80 μm^3, which is not consistent with iron deficiency. Therefore, decreased serum ferritin would not be expected.

(Choice 3) is not associated with multiple myeloma but is seen with disorders of the parathyroid.

(Choice 4) is not related to multiple myeloma but is a disorder of lipid metabolism.

(Choice 5) Multiple myeloma is associated with hypercalcemia (due to lytic effects on bone), not hypocalcemia.

40. Question

1 points

A 38 year old woman is complaining of shortness of breath that started suddenly on the morning of presentation. She is an otherwise healthy woman. She takes oral contraceptive pills, and she has a 10-yearhistory of smoking a pack of cigarettes daily. She appears anxious and is rapidly breathing at 30 breaths/min. Her pulse is 110/min, and her blood pressure is 120/80mm Hg and stable. The rest of her physical examination is unremarkable. Which of the following is the most appropriate initial step in management?

1. Aspirin
2. Coumadin
3. Heparin ✔

4. IV fluid

5. Streptokinase

INCORRECT ✖

The correct answer is 3.

This patient probably has a pulmonary embolism (PE). Oral contraceptive pills and smoking place her at an increased risk for thromboembolic disease. The most common symptoms of PE include tachypnea and tachycardia. Shock may also ensue, and a massive PE can result in loss of blood pressure. This patient has a stable blood pressure at this time. Thus, placing her on heparin immediately would be appropriate to prevent the clot burden from further increasing.

(Choice 1) would succeed in inhibiting platelet aggregation and would be appropriate if the patient had a coronary syndrome, such as myocardial infarction.

(Choice 2) would be appropriate as a longterm choice for anticoagulation in this patient. However, it would take several days before the drug would be an effective anticoagulant and would not be of use in this acute setting. Ultimately, this patient would be taken off heparin and switched to Coumadin.

(Choice 4) would be useful if this patient's blood pressure were falling in order to support her circulation. Since she is hemodynamically stable, she needs heparin before any other supportive therapy.

(Choice 5) could be used to immediately lyse the PE, but this would be indicated only if the patient were hemodynamically unstable with a low blood pressure or refractory hypoxemia. Because she is currently maintaining her blood pressure and is not exhibiting signs of right heart failure, streptokinase need not be given, avoiding the associated risk of bleeding and stroke.

41. Question

1 points

A 35 year old man is brought to the emergency department after he faints and cannot be revived. Stat chemistries are notable for a plasma glucose of 23 mg/dL. The patient is promptly given N glucose and recovers consciousness. Careful questioning reveals that he has a family history of endocrine abnormalities. Follow-up studies performed on the remainder of the blood drawn for the screening studies demonstrate insulin levels of 120 mU/mL (reference range 5-25 mU/mL). A CT scan of the abdomen demonstrates a 2- cm mass in the tail of the pancreas. Which additional finding will most likely be seen this patient?

1. Marfanoid habitus

2. Medullary carcinoma of the thyroid

3. Mucosal neuromas
4. Parathyroid adenoma ✔
5. Pheochromocytoma

INCORRECT ✖

The correct answer is 4.

This is a question about multiple endocrine neoplasia (MEN) type I, also known as Wermer syndrome. The patient has a probable pancreatic islet cell tumor that is secreting insulin. In MEN I, 30 to 75% of the patients develop pancreatic islet cell tumors, and about 40% of those develop insulin secreting tumors. The remainders of the islet cell tumors are derived from non-B cell elements and can secrete a variety of substances, most commonly gastrin (producing the multiple peptic ulcers of Zollinger-Ellison syndrome). Other features of MEN 1, which may occur either sequentially or concurrently, include parathyroid adenomas (more than 90% of cases) and pituitary adenomas (SO to 65% of cases). Parathyroid adenomas are also found in 25% of MEN IIA cases and rarely in MEN IIB. Pancreatic islet cell tumors and pituitary adenomas are not a feature of MEN IIA or MEN IIB.

(Choices 1 & 2) Marfanoid habitus is a feature of MEN IIB. Medullary carcinoma of the thyroid is a feature of MEN IIA and MEN IIB.

(Choices 3 & 5) Mucosal neuromas are a feature of MEN IIB. Pheochromocytoma is a feature of MEN IIA and MEN IIB.

42. Question

1 points

A 45 year old man presents to a physician because of repeated episodes of fainting. The radial pulse is erratic, with multiple skipped beats at a rate of 45 beats/min. An ECG shows a normal sinus rhythm at a rate of 60/min. An echocardiogram reveals a 2-cm mass that is acting like a "ball valve" to produce intermittent obstruction of flow. Which of the following is the most likely location of this patient's lesion?

1. Aorta
2. Left atrium ✔
3. Left ventricle
4. Right atrium
5. Right ventricle

INCORRECT ✖

The correct answer is 2.

The most common primary cardiac tumor of adults is the benign atrial myxoma. Ninety percent of these lesions involve the left atrium, where they can produce intermittent obstruction when they prolapse into the mitral orifice during diastole. Resection is curative.

(Choices 1,3,4 & 5) Other tumors occur less commonly. Lipomas may involve the left ventricle, right atrium, or atrial septum. Rhabdomyomas are found in children and usually involve the left ventricle or the right ventricle. The aorta is not a common site of tumor formation.

43. Question

1 points

A diabetic patient is undergoing a routine physical examination. During the review of systems, the patient comments that he has been having pain on swallowing. He localizes the pain to below his sternum. Barium swallow shows slightly raised plaques throughout the esophagus. Endoscopy demonstrates plaques covered with white, curdy, cheese-like material. A biopsy of one of the lesions will most likely demonstrate which of the following?

1. Acute-angled, branching, septated filaments
2. Anaplastic squamous cells with numerous mitotic figures
3. Intranuclear and cytoplasmic inclusion bodies with "owl's-eye" appearance
4. Loss of ganglion cells in the myenteric plexus
5. Multinucleated epithelial giant cells on Giemsa stain
6. Pseudohyphal mycelia and budding yeast cells ✔

INCORRECT ✖

The correct answer is 6.

White, curdy, cheese-like material specifically suggests thrush due to Candida albicans, whether it occurs in the mouth, vagina, or esophagus. This fungus occurs in both yeast and fungal forms, with both hyphae and pseudohyphae and budding yeast cells. Candida is usually a mouth and vagina commensal organism but can cause clinical disease, particularly among the immunosuppressed. Diabetics are particularly likely to develop clinical Candida infections because they are both immunosuppressed and have body secretions with a high sugar content on which the fungi like to feed.

(Choice 1) describe Aspergillus, a much less common esophageal pathogen seen most often in AIDS patients. Although it can produce mucosal thickening, it does not cause the white, cheesy curd of Candida.

(Choice 2) describe squamous cell carcinoma of the esophagus. Diabetic patients are at no greater risk for esophageal carcinoma. Risk factors include alcohol use and cigarette smoking. Esophageal carcinoma typically presents with weight loss and progressive difficulty in swallowing.
(Choice 3) describe cytomegalovirus, a cause of esophageal ulcers, especially in AIDS patients.
(Choice 4) Achalasia presents with pain upon swallowing, and a loss of ganglion cells in the myenteric plexus is seen on biopsy. However, there are no visible lesions seen on endoscopy, and there is no association with diabetes.
(Choice 5) describe herpes simplex virus, a cause of esophageal ulcers in AIDS patients.

44. Question

1 points

A 45 year old woman comes to the physician because of persistent blurred vision for the past month. She also reports three episodes of Candida vaginitis during the past year. She is 167 cm (66 in) tall, and weighs 84 kg (185 lb). Her blood pressure is 130/84 mm Hg. Funduscopic examination reveals dot retinal hemorrhages and increased tortuosity of retinal veins. Her family history is significant for obesity, coronary artery disease, and type 2 diabetes mellitus in several relatives. Examination reveals no significant abnormalities. Dipstick urinalysis is normal. Which of the following is the most appropriate next step in diagnosis?

1. Blood test for C-peptide
2. Fasting blood glucose level ✔
3. Glucose tolerance test
4. Glycosylated hemoglobin
5. Urine glucose levels

INCORRECT ✖

The correct answer is 2.

This patient most likely has type 2 diabetes mellitus. This form represents 90 to 95% of all cases of diabetes mellitus in the Australia. The most common presentation of type 2 diabetes is that of an individual found to have hyperglycemia on routine laboratory investigations. Otherwise, patients present most frequently with symptoms due to diabetic complications, such as recurrent vulvovaginitis/balanitis, blurred vision, impotence, and peripheral neuropathy. Type 2 diabetes patients are often obese and older than 30 years. In this example, ophthalmoscopy reveals some

of the findings associated with the nonproliferative stage of diabetic retinopathy, which accounts for decreased vision. Fasting blood glucose level is the recommended first-line test to screen for diabetes.

(Choice 1) Blood test for C-peptide documents function of pancreatic beta cells but is not useful in the diagnosis of diabetes. It may be useful in the diagnosis of insulinoma or factitious insulin injection.

(Choice 3) Glucose tolerance test is no longer used for screening or diagnostic purposes because of its low specificity. It is performed by measuring glucose levels after the patient is given a load of 75 g of glucose following overnight fasting. It is still useful in the diagnosis of pregnancy-related diabetes.

(Choice 4) Glycosylated hemoglobin reflects the mean blood glucose levels in the preceding 3 months. Normal values are below 7%. This test is not used for screening or diagnosis, but rather to check the adequacy of longterm glycemic control.

(Choice 5) Urine glucose levels do not detect hyperglycemia if the blood glucose is below 180 mg/ dL (the renal threshold for glucose excretion). Furthermore, this test may be affected by many conditions that can cause false negative or false positive results.

45. Question

1 points

A 61 year old woman presents with complaints of 2 months of low-grade fevers and malaise. She states that she has been having frequent right-sided headaches without any other associated neurologic symptoms. On physical examination, she has a temperature of 37.9 C (100.2 F), and her neurologic examination is unremarkable. Laboratory results reveal a white blood cell count of 11,200/mm^3 and a hematocrit of 36%. Serum electrolytes are normal, and her erythrocyte sedimentation rate (ESR) is 86/min. Which of the following is the most appropriate next step in management?

1. Carotid artery Doppler flow studies
2. Ergotamine
3. High-dose N penicillin
4. High-dose steroids ✔
5. Oral nonsteroidal anti-inflammatory drugs (NSAIDs)

INCORRECT ✖

The correct answer is 4.

This case describes a typical presentation of temporal arteritis, a systemic disease of inflammation of medium and large arteries. The disease affects older patients (>55 years) and has a female preponderance. Fever, anemia, elevated ESR, and headaches make up

the classic complex of symptoms. Although definitive diagnosis is made by biopsy of the temporal artery, the condition is usually suspected on the basis of the clinical presentation. If steroids are not administered immediately (at the first suspicion of the disease), the patient has a high likelihood of developing blindness.
(Choice 1) The presentation is not suggestive of narrowing of the carotid artery. If atherosclerosis of the carotid artery were present, the patient may have experienced transient ischemic attacks or stroke, or may have been found to have a bruit over the artery, indicating the need for a carotid artery Doppler flow study.
(Choice 2) is used to treat migraine headaches. The ESR would be normal, and the patient afebrile. Migraines typically last 4- 72 hours and may have associated neurologic symptoms. In addition, the age at initial presentation is typically younger.
(Choice 3) The presentation is not suggestive of a bacterial process. The fever is low grade, and the white cell count is within the normal range. Temporal arteritis would not respond to antibiotics.
(Choice 5) NSAIDs are for treatment of headache. The presentation of this case suggests a more systemic disease. Temporal arteritis would not respond to NSAIDs.

46. Question

1 points

A 60 year old woman presents with complaints of chronic fatigue and mild pruritus. She has a history of rheumatoid arthritis and autoimmune thyroiditis. On examination, her liver is modestly enlarged, firm, and nontender; skin xanthomas are noted. Routine serum chemistry studies show:

Sodium: 141 mEq/L
Potassium: 5.1 mEq/L
Chloride: 102 mEq/L
Bicarbonate: 25 mEq/L
Albumin: 4.1 g/dL
Urea nitrogen: 25 mg/dL
Bilirubin, total: 1.3 mg/dL
Creatinine: 0.8 mg/dL
AST: 55 U/L
ALT: 48 U/L
Alkaline phosphatase: 240 U/L

Follow-up laboratory studies demonstrate a serum gamma-glutamyl transpeptidase level of 150 U/L, and a serum cholesterol of 240 mg/dL. Immunoglobulin studies reveal a marked elevation of serum IgM. Ultrasound demonstrates diffuse enlargement of the liver without marked echogenicity. Endoscopic retrograde cholangiography demonstrates an intact extrahepatic biliary tree accompanied by stricture and loss of ducts within the liver itself. Liver biopsy shows a florid bile duct lesion with patchy inflammation and destruction of septal and interlobular bile ducts. Antibodies directed against which of the following antigens are present in up to 95% of patients with this disease?

1. Double-stranded DNA
2. Hepatitis A virus
3. Hepatitis B core antigen
4. Hepatitis C virus
5. Mitochondria ✔

INCORRECT ✖

The correct answer is 5.

The disease is primary biliary cirrhosis. This autoimmune disease is characterized by progressive destruction of intrahepatic bile ducts. In early stages of the disease, intense inflammation of the bile ducts can be seen on biopsy, often accompanied by bile duct proliferation as the liver attempts to compensate. Later stages are characterized by initial portal fibrosis that eventually evolves to frank cirrhosis. Patients tend to be women, aged 35-70 years, who typically present with insidious disease and often have a history of other autoimmune disease. Chronic fatigue and pruritus are common initial complaints. Hepatomegaly or hepatosplenomegaly may be present, as may skin xanthomas or hyperpigmentation. In laboratory studies, elevations of alkaline phosphatase and gamma-glutamyl transpeptidase are usually out of proportion to those of serum bilirubin and aminotransferases. Endoscopic retrograde cholangiography can be helpful in distinguishing the condition from the related primary sclerosing cholangitis, which damages both the extrahepatic and the intrahepatic biliary system. Biopsies early in the disease may demonstrate florid bile duct destruction; later biopsies are more likely to show nonspecific hepatic fibrosis or cirrhosis. A very helpful test is to measure autoantibodies directed against mitochondrial antigens, since this test is positive in up to 95% of patients with primary biliary cirrhosis; a few patients with “autoimmune” chronic active hepatitis may also have these antibodies.

(Choice 1) Anti-double-stranded DNA is quite specific for systemic lupus erythematosus.

(Choice 2) usually produces acute hepatitis with much more marked elevation of transaminases.

(Choices 3 & 4) Determination of antibodies to hepatitis B core antigen and hepatitis C virus is usually used for evaluation of chronic viral hepatitis, which microscopically may show portal inflammation and fibrosis but does not show selective damage to bile ducts.

47. Question

1 points

A 62 year old man comes to the physician because of episodic chest pain that manifests as a sensation of precordial tightness, occurs after physical exertion, and is relieved promptly by rest. The patient has noted that the amount of activity sufficient to trigger the pain is relatively constant,

such as climbing three flights of stairs or walking uphill for a few minutes. An ECG recorded at rest, however, fails to show any abnormalities. Which of the following is the most appropriate next step in diagnosis?

1. Ambulatory ECG monitoring
2. Echocardiography
3. Exercise ECG ✔
4. Myocardial perfusion scintigraphy
5. Coronary arteriography

INCORRECT ✖

The correct answer is 3.

The patient's symptomatology is consistent with angina pectoris. During ischemic attacks, ECG usually shows a flat or down-sloping ST depression. The resting ECG may be normal in up to 25% of patients with typical angina between the attacks. In patients without ECG abnormalities at rest, exercise ECG is the most useful and cost-effective test to document myocardial ischemia.

(Choice 1) is mainly used to document clinically silent (i.e., painless) episodes of myocardial ischemia, which may be more frequent than the clinically apparent ones in some patients.

(Choice 2) may reveal abnormalities in ventricular wall motion, which can be a result of current ischemia or prior myocardial infarction. It allows the study of left ventricular function, which is an important prognostic factor that influences treatment strategies as well.

(Choice 4) is performed by injection of radiotracers (thallium-201and technetium-99m are the most frequently used), which are taken up by viable myocardium. Scintigraphic defects indicate areas of ischemia. This is usually done after exercise ECG.

(Choice 5) is the gold standard for the diagnosis of coronary artery disease since it documents site and severity of stenotic lesions. Generally, it is indicated when coronary artery revascularization is being considered; it is not a first diagnostic procedure. It has a mortality of 1/ 1000.

48. Question

1 points

A 49 year old man with acute pancreatitis develops severe shortness of breath 15 minutes after undergoing placement of a catheter in his subclavian vein. His blood pressure is 100/60mm Hg, pulse is 124/min, and respirations are 50/min. He is cyanotic and in obvious distress. His neck veins are distended, and his trachea deviates to the left. Breath sounds are diminished on the right side of his chest. Which of the following is the most appropriate next step in management?

1. Chest x-ray
2. Removal of the catheter
3. Endotracheal intubation
4. Needle thoracostomy in the second right intercostal space ✔
5. Tube thoracostomy in the left fifth intercostal space

INCORRECT ✖

The correct answer is 4.

A significant risk associated with catheterization of the subclavian veins is a closed traumatic pneumothorax due to puncture of the apex of the lung. Hypotension, tachycardia, tachypnea, and cyanosis all favor this diagnosis. Classic clues in the patient's presentation are the distended neck veins, diminished breath sounds on the right side of the chest, and tracheal deviation to the opposite side. The most appropriate immediate treatment is needle thoracostomy at the second right intercostal space followed by chest tube insertion at the right fifth intercostal space.

(Choice 1) is not necessary in this patient since the clinical examination was sufficient for making the diagnosis. Waiting for chest x-ray results before treating this unstable patient could prove fatal. Note, however, that chest x-rays are routinely performed after catheterizations to rule out subclinical pneumothoraces. On x-ray films, a pneumothorax appears as a region of air without peripheral lung markings limited by a distinct pleural boundary with medial lung markings.

(Choice 2) would not treat the punctured lung. Note that future attempts at central line placement should be attempted on the right side in this patient to avoid the possibility of creating bilateral pneumothoraces.

(Choice 3) would not relieve the pneumothorax and would not be expected to improve respiratory status until the pneumothorax was successfully treated.

(Choice 5) would be on the wrong side in this patient with a right pneumothorax.

49. Question **1 points**

A 31 year old Asian man presents to the clinic for an annual physical. He has a 19-year history of type 1 diabetes, requiring 10 units NPH insulin each morning and 8 units NPH in the evening, with frequent blood glucose checks and regular insulin dosing throughout the day. He does not keep a log of his blood glucose values. A urine dipstick test shows 2+ albumin. His hemoglobin A1c (HbA1c) is 7 .9%. Which of the following is the most appropriate next step in management to prevent morbidity?

1. Add a standing regular insulin dose at lunchtime

2. Begin ACE inhibitor therapy ✔
3. Discuss options for using an insulin pump
4. Increase his morning NPH insulin dose
5. Send a 24-hour urine collection specimen for total protein

INCORRECT ✖

The correct answer is 2.

The concepts underlying this question are those of diabetes mellitus and the prevention of its complications. Many clinical trials have shown the beneficial effects of ACE inhibitors on preventing nephropathy and slowing the progression of established nephropathy in diabetics. This patient has microalbuminurial as shown by his urine dipstick, suggesting developing renal disease. It is the standard of care that all diabetics be given an ACE inhibitor if they are able to tolerate its blood pressure effects.

(Choices 1 & 4) Adding a standing regular insulin dose at lunchtime or increasing his morning NPH insulin dose may be appropriate, although we do not know the details of his daily glucoses since he does not keep a glucose log. His non-optimal HbA_{1c} clearly indicates that his blood glucose control needs to be improved, but at this time we do not yet know the best way to accomplish this goal. The standard of care is for a goal HbA_{1c} less than 7%.

(Choice 3) Discussing options for using an insulin pump, similar to choices A and D, may be an option, depending on the details of this patients daily blood glucoses and his ability to comply with a stricter regimen.

(Choice 5) Sending a 24-hour urine collection specimen for total protein is not appropriate at this stage given the likelihood that this patient is developing diabetic nephropathy. Quantifying urine protein will not change this patient's management, namely, the addition of an ACE inhibitor.

50. Question

1 points

A 55 year old patient presents with chronic cough. In addition to the cough, the patient has gained weight recently with development of a "buffalo hump" and Cushingoid features. A chest x-ray film demonstrates a mass involving the central area of the chest. Bronchoscopy is performed, and it proves possible to biopsy the tumor during the procedure. Which of the following is the most likely diagnosis?

1. Adenocarcinoma
2. Bronchioloalveolar carcinoma
3. Large cell carcinoma

4. Small cell carcinoma ✔
5. Squamous cell carcinoma

INCORRECT ✖

The correct answer is 4.

The patient has bronchogenic lung cancer, which has produced Cushing syndrome as a paraneoplastic syndrome related to secretion of substances similar to ACTH. Small cell carcinoma of the lung is particularly notorious as a secretor of bioactive substances, including ADH, ACTH, parathormone, prostaglandins, calcitonin, gonadotropins, and serotonin. Small cell carcinoma of the lung has a strong association with smoking.

(Choice 1) Adenocarcinoma of the lung, when used in questions, usually refers to adenocarcinoma without further differentiating features. This form of cancer can be seen in bronchi, as a coin lesion in the lung periphery, or involving scarred areas of lungs.

(Choice 2) Remember bronchioloalveolar carcinoma as the type that is not associated with smoking.

(Choice 3) Large cell carcinoma is an aggressive, undifferentiated form of lung cancer.

(Choice 5) Associate squamous cell carcinoma of the lung with the specific paraneoplastic syndrome of hypercalcemia.